THE

NATURALIST:

A

MONTHLY JOURNAL OF

Natural History for the North of England

EDITED BY

W. H. PEARSALL, D.Sc., F.L.S., and W. R. GRIST, B.Sc.,
THE UNIVERSITY, LEEDS

with the assistance as referees in special departments of

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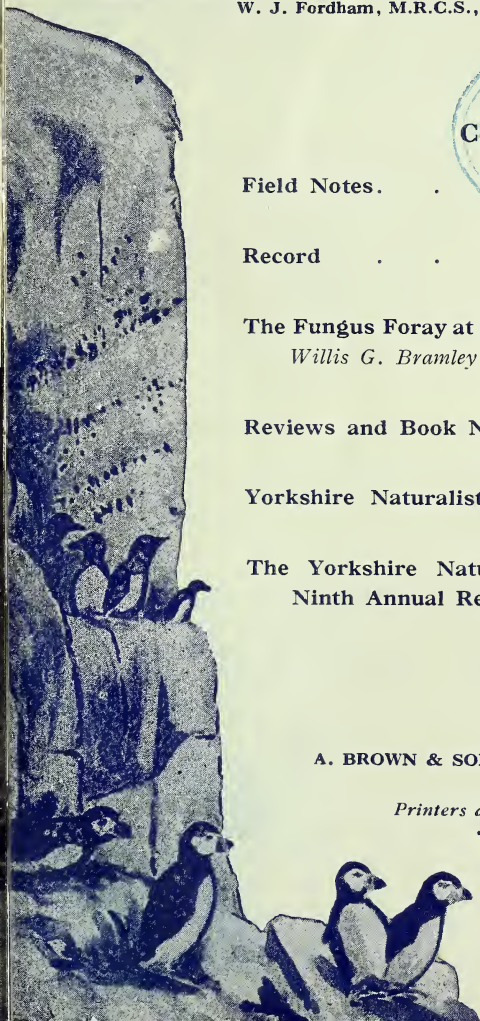

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JAN 23 1941

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THE NATURALIST

FOR 1941

FIELD NOTES

Northern Golden Plover.—Definite records of the passage of the Northern Golden Plover do not seem very numerous, so that this note, although late, may be of interest. On May 2nd, 1939, near the River Hull at Aike a flock of thirty birds of this type was watched for some time. The colouration of the breast and underparts was particularly striking after having a short time before watched resident birds in the North Riding.—G. H. AINSWORTH and J. LORD, M.Sc.

Caspian Terns (*Hydroprogue caspia*, **Pallas.**) **in Yorkshire.**—Two examples of this, the largest, and one of our rarest, Terns, have recently been reported from Yorkshire. In *Country Life* of November 30th, 1940, p. xxvi, Mr. H. W. Robinson says a bird of the American race of this species (and which he states is the first record in England for this Transatlantic form), was picked up dead by a schoolboy at Whitby, Yorks., in August, 1939. 'It bore a ring, No. 566280, put on as a chick in the largest colony in North America, in northern Lake Michigan, on July 14th, 1927, by the late Wm. J. Lyon, of the Biological Survey.' In *The North-Western Naturalist*, Vol. XV, No. 3, p. 153 (dated September, but received in December, 1940), Dr. Walter E. Collinge states: 'On April 2nd Mr. Ben Foggitt, of Thirsk, brought me a bird which he thought might be an immature specimen of the Caspian Tern, and on careful examination this proved to be so. The specimen, which was in a very emaciated and high condition, was picked up by Mr. Harry Kitching near Kirby-in-Cleveland.' Although the Caspian Tern has a very wide range there is only one record for it in Nelson's *Birds of Yorkshire*, viz., one shot at Filey early in September, 1874.—H.B.B.

RECORD

GREEN WOODPECKER IN WESTMORLAND

EARLY in November a green woodpecker (*picus viridis pluvius*) was seen in the grounds of Middleton Hall, near Kirby Lonsdale, Westmorland. The bird is an occasional winter visitor to the north-west but its appearances are becoming rare. Early eighteenth century records indicate that the green woodpecker was common enough in the district, but in *Birds of Lancashire* (1892) Mitchell describes it as 'a rarely occurring species on the whole' and since that time it has become even less frequent.—SYDNEY MOORHOUSE.

JAN 23 1941

THE FUNGUS FORAY AT GRASS WOOD

JOHN GRAINGER, WILLIS G. BRAMLEY, AND JENNIE GRAINGER

THE Annual Foray for 1940 of the Mycological Committee of the Union was held at Kilnsey from September 14th to 18th. The General Meeting was held in the Tennant Arms Hotel on the 14th at 8 p.m. The Chairman's address on ' Historical Ecology of the Fungi ' has already been published in *The Naturalist*.

Mr. J. W. H. Johnson, M.Sc., was elected Chairman for the year 1941, but otherwise the constitution of the Committee remained as before.

Although the Wharfe overflowed its banks during the Foray, the drought proved to be too powerful for many of the larger fungi. Grass Wood was very dry and agarics were few and far between, but proved to be somewhat more plentiful in Bastow Wood higher up the hill side, where *Lactarius tominosus* was the commonest. On the Wednesday, therefore, the other side of the river was explored, including Netherside and the pasture and scrub slopes back to Kilnsey. This proved more prolific, but even so must be considered poor. An hour or two on Thursday between Conistone and Kettlewell yielded nothing new except one or two rusts, rain finally putting an end to collecting.

One of the features of the foray was the number of the common mushroom which were seen and collected, duly appearing on the dining room table. Rusts were not much in evidence, and this also applies to *Pyrenomycetes*. There was very little rotten damp wood lying about. Most of this was Beech felled two or three years ago. The bark has fallen away generally and the wood was too hard and dry to harbour *Myxomycetes*, only two of which were found and in very small quantity.

In striking contrast to Kilnsey was Austwick where one of the authors (W.G.B.) spent the remainder of the week. Here agarics were numerous in the woods on Oxenber, both in species and numbers, and one field in particular evoked comment by the thousands of several species of *Hygrophorus* which studded its surface.

Finally, our thanks are due to A. A. Pearson, whose unavoidable absence all regretted, for his generous help in naming parcels of material sent to him and without which many species would have not been named.

Species unmarked or marked * from Grass Wood.
,, marked † ,, Netherside and Kilnsey.
,, ,, ‡ ,, garden at Headquarters.

MYXOMYCETES

†*Lycogalacæa epidrendrum.*
Trichia persimilis.

PHYCOMYCETES

Peronospora parasitica.

ASCOMYCETES

‡*Sphærotheca pannosa.*
Erysiphe Polygoni.
†*Coryne sarcoides.*
†*Chlorosplenium æruginosum.*
Helotium claro-flavum.
Trichoscypha calycina.
†*T. subtillissima.*
†*Mollisia cinerea.*
Pseudopeziza trifolii.
*†*Rhytisma acerinum.*
Glonium mytilinum, new to Yorks.
Nectria cinnabarina.
Hypomyces aurantius.
*†*Bertia moriformis.*
†*Zignœlla ovoidea.*
Melanomma pulvis-pyrius.
‡*Cucurbitaria laburni.*
†*Leptosphæria acuta.*
Ophiobolus acuminatus.
Melanconis stilbostoma.
Diatrype stigma.
D. flavo-virens.
**Diatrypella verruciformis* on Hazel.
†*D. verruciformis* on Birch.
Hypoxylon coccineum.
H. fuscum.
†*H. multiforme.*
H. rubiginosum.
Xylaria carpophila.
*†*X. Hypoxylon.*

BASIDIOMYCETES

Ustilaginales

Ustilago Scabiosæ.

Uredinales

Pucciniastrum pustulatum.
‡*Coleosporium senecionis.*
C. Tussilaginis.
C. Petasitis.
Triphragmium Ulmariæ.
Phragmidium Sanguisorbæ.
‡*P. subcorticium.*
Xenodochus carbonarius.
Uromyces Valerianæ.
U. Geranii.
U. Alchemillæ.
U. Rumicis.
Puccinia expansa,
P. Centaureæ.
P. Cirsii.
†*P. Taraxici.*
†*P. Celakovskyana.*
P. Menthæ.
P. Violæ.
P. Holcina.
P. Poarum.
P. Baryi.
P. pygmæa Erikss., II, III, on *Calamagrostis epigeics*, new to Britain.

Agaricales

Amanitopsis vaginata.
Lepiota cristata.
L. granulosa.
*†*Armillaria mellea.*
Tricholoma equestre.
T. rutilans.
†*T. carneum.*
T. leucocephalum.
Russula cyanoxantha.
*†*R. ochroleuca.*
R. fragilis.
R. atropurpurea.
*†*R. depallens.*
†*R. Grisea.*
*†*Mycena galericulata.*
*†*M. polygramma.*
*†*M. alcalina.*
M. allopus.
Collybia radicata.
C. maculata.
C. velutipes.
†*Marasmius oreades.*
M. hariolorum.
Androsaceus rotula.
*†*Lactarius torminosus.*
L. pallidus.
L. subdilcis.
L. concavus.
L. subumbonatus.
Hygrophorus eburneus.
H. pratensis.
†*H. cinereus.*
H. virgineus.
†*H. niveus.*
H. ceraceus.
†*H. intermedius.*
†*H. conicus.*
*†*H. chlorophanus.*
*†*H. psittacinus.*
†*H. spadiceus.*
Clitocybe infundibuliformis.
C. cyathiformis.
†*C. expallens.*
C. fragrans.
Laccaria amethystina.
Omphalia fibula.
Pleurotus sapidus.
P. ostreatus.
Panus torulosus.
†*Pluteus nanus.*
Clitopilus prunulus.
†*Eccilia griseorubella.*
†*Pholiota togularis.*
P. squarrosa.
†*P. mutabilis.*
†*Inocybe Cookei.*
I. fastigiata.
Hebeloma crustuliniforme.
*†*Galera tenera.*
G. hypnorum.
†*Tubaria furfuracea.*
Cortinarius (Dermo) anomalus.
*†*Psalliota campestris.*
Stropharia aeruginosa.
*†*S. merdaria.*
S. stercoraria.
*†*S. semiglobata.*
*†*Anellaria separata.*
Hypholoma epixanthum.
*†*H. fasciculare.*
Panæolus phalænarum.
†*P. papilionaceus.*
Psilocybe semilanceata.
Coprinus micaceus.
†*C. lagopus.*
C. radiatus.
Paxillus involutus.
Boletus luteus.
B. elegans.
B. viscidus.

BASIDIOMYCETES—*Continued.*

AGARICALES

Boletus badius.
B. versipellis.
B. scaber.
†*Polyporus varius.*
†*P. betulinus.*
*†*P. adustus.*
P. cæsius.
Fomes ferruginosa.
Poria hymenocystis.
*†*Polystictus versicolor.*
†*P. abietinus.*
†*Irpex obliquus.*
Trametes gibbosa.
T. mollis.
†*Grandinia farinacea.*
G. helvetica.
Stereum rugosum.
S. sanguinolentum.
*†*Siereum hirsutum.*
S. purpureum.
Corticium læve.
C. Sambuci.
C. confluens.
†*C. prætermissim.*
Peniophora velutina.
P. cinerea.
Solenia anomala.
†*Clavaria vermicularis.*
Tremella mesenterica.
Calocera viscosa.
C. cornea.
*†*C. stricta.*
†*Lycoperdon cælatum.*
L. saccatum.
*†*L. perlatum.*

FUNGI IMPERFECTI

*†*Colletotrichum liliacearum* (West) Dake on Bluebell stems. *Sepedonium chrysospermum.*

REVIEWS AND BOOK NOTICES

Lincolnshire in the 17th and 18th Centuries, by **Charles Brears.** Pp. xvi.+192, with 9 maps and diagrams. A. Brown & Sons, Ltd., 7/6. A comprehensive survey of the social and economic trends of these two centuries. In drawing copiously but judiciously from authentic sources the author has succeeded in building up a living picture of the life of the average man of those times. Of particular local interest is the section dealing with the reclamation of the fens. The sections devoted to Religion, Education, Agriculture, and Communications have a national appeal. In all its aspects the book will appeal to specialist and laymen alike, and can be recommended to both for reading with profit and pleasure.

Welsh Ferns: A Descriptive Handbook by **H. A. Hyde, M.A., and A. E. Wade, F.L.S.**, pp. x+132 with 10 plates and 67 text figures. Published by the National Museum of Wales, Cardiff. This work completes a survey of the flowering plants and ferns of Wales. Unlike its predecessor, which was largely an annotated catalogue of the distribution of flowering plants in the Welsh counties together with data as to the specimens contained in the national collection at Cardiff, this volume is more in the nature of an up-to-date handbook of British ferns. Keys are supplied to the genera and species of all native ferns together with newly-written descriptions. The inclusion—in smaller type—of species absent from Wales will greatly increase the usefulness of the book. Information as to first Welsh records, distribution and material contained in the Cardiff herbarium is appended to the descriptions of the species. The introductory sections deal with the morphology and life history of ferns, the principles underlying modern groupings and the geographical distribution of the Welsh species. The nomenclature has been brought up to date and some unfamiliar names greet the reader. This book is comprehensive yet inexpensive, up to date and well illustrated: as such it fills a gap in the literature of British botany and is strongly recommended to all, beginners or students, interested in British ferns.

The Naturalist

Birds of the Grey Wind by **Edward Allworthy Armstrong**, pp. xvi+228 with 46 plates. Oxford University Press, 12/6. Mr. Armstrong, who now lives in Yorkshire, here writes about the birds of the country that he loves, the country of his youth, Northern Ireland. Every sentence in the book reveals the keen, well-informed and trained ornithologist. Evidences of first-hand observations are to be found on nearly every page, the writer's style is delightful, and he is not afraid of putting forward his own theories regarding bird behaviour. In doing so he obviously invites discussion and criticism and other ornithologists will find plenty of material for this purpose. The illustrations are all good and very well chosen. The naturalist visiting Northern Ireland should on no account miss an opportunity of reading Mr. Armstrong's book.

Courtship and Display Among Birds by **C. R. Stonor**, pp. xvi +140 with 57 plates. Country Life, 8/6. This very complete review and discussion of the main facts relating to the behaviour of birds in the mating season and to the associated displays and ceremonies is the work of one eminently qualified for the task. Mr. Stonor is an experienced field naturalist and he is also a professional biologist of long standing, having worked in the Zoological Gardens and in the Natural History Museum in London. Courtship habits and displays among wild birds are notoriously difficult to observe at all continuously and it is fatally easy to explain one's observations on anthropomorphic lines. Mr. Stonor avoids this and other pitfalls and is very cautious and restrained, in spite of the immense quantity of material he has collected. Bird-watching of this specialised type, important though it is, has only recently come into its own, and that there is still the bulk of the work to do is evident after reading Mr. Stonor's excellent account of the present position of the subject. Undoubtedly the periodicity of gland secretions determines the variations in behaviour, plumage, etc., but the conditions governing this periodicity have yet to be fully investigated. Even when this has been done, we shall still be a long way from a complete knowledge of the bird mind, the measure of its individuality, its choice of action, and its awareness of itself. Mr. Stonor has selected a fine series of photographs to illustrate his subject.

Photosynthesis, by **E. C. C. Baly, C.B.E., F.R.S.**, Emeritus Professor of Chemistry in the University of Liverpool. Methuen, London, pp. 248, 24 figs. in the text. 1940, 15/-. Readers acquainted with Professor Baly's work on the chemistry of photosynthesis can hardly have failed to anticipate in his book an interesting and provocative treatment of the subject. The outlook differs materially from that of the previous texts of Stiles and Spoehr in considering photosynthesis in plants simply as a problem in photochemistry, and in omitting all but the scantiest mention of experiments with plants. In the introductory chapters the difficulties encountered from the energy standpoint are pointed out with admirable clarity, and are shown to form a basis for the conception of activated formaldehyde as the intermediate product in carbohydrate synthesis. While few physiologists would care to argue against this viewpoint, the reasons given here for the rejection of glycollic and glyceric aldehydes as possible intermediates fail to be entirely convincing, and one feels that the treatment of this aspect of the subject would have been more complete if, for instance, formic and oxalic acids had also been considered. These two substances cannot be rejected merely on the grounds that they give the wrong O^2/CO^2 ratio in the initial reactions. Chapters 2 to 5 are devoted to the history of attempts to synthesise organic compounds by irradiation with ultraviolet light of aqueous solutions of carbon dioxide, and, later, the use of suspensions of green inorganic salts whereby ultraviolet light may be replaced by white light. This most fascinating story is told with a wealth of experimental detail,

and even the most hardened plant physiologist cannot fail to be impressed by the chemical ingenuity and manipulative skill which led to the final achievement in the synthesis of starch-like substance. It is somewhat startling to find nitrogen metabolism treated definitely as part of the photosynthetic mechanism. Few plant physiologists would care to go quite so far. Professor Baly presents sound chemical arguments for his statement that organic nitrogen compounds like pyrrole and histidine can be photosynthesised by irradiation of KNO_2 solutions containing formaldehyde or formhydroxamic acid, but the physiological background seems somewhat obscure. It is clear that the first step in the assimilation of nitrate nitrogen is a reduction to nitrite, but we have good reason to believe that this reduction goes still further to ammonia. Prianischnikow's view of ammonia as the α and ω of protein synthesia is now rather widely accepted, and it is therefore somewhat paradoxical that Baly apologises for including experiments with ammonium compounds. Subsequent considerations of the O^2/CO_2 ratio in an attempt to substantiate the photosynthetic nature of nitrogen assimilation are certainly quite sound but rather beside the point. Rapid protein synthesis, whether photochemical or not, is bound to affect the ratio in experiments lasting over any appreciable time ; though the comparison between the ratio obtained experimentally by Maquenne and Demoussy (1.035) and that calculated on the assumption that carbohydrate carbon and protein carbon are simultaneously produced in the ratio 11 : 1 (1.035) loses much of its force when we realise that the former figure does not, in fact, differ significantly from unity (actually 1.035+0.036, calculated from Table XII, p. 159). Finally the mechanism and kinetics of photosynthesis receive a detailed treatment following Baly's interesting speculation that the photoprocesses involve absorption of one quantum each of red and of blue light. The book is written by a master in his subject and contains much more material of great theoretical interest than can possibly be mentioned in a brief review. As a record of a thoroughgoing and painstaking attempt to give a chemical explanation of metabolic activities in plants, it merits a place on the book shelves of the physiologist. One finds difficulty, however, in interpreting these *in vitro* experiments in terms of the plants. The apparent variety of substances produced, using ' catalysts ' or ' sensistisers ' not differing widely in their chemical constitution, leaves a feeling of doubt as to the logic involved in carrying over these experiments to an interpretation of phenomena in the plant. Much more work needs to be done on photosynthesis *in the plant* before any strict comparison can be made.

YORKSHIRE NATURALISTS' UNION ANNUAL MEETING 1940

The Annual Meeting of the Union was held in the Technical College, Bradford, on Saturday, December 7th, 1940. This had been kindly arranged for us by Mr. A. Malins Smith when it was seen that it was still impossible to get to Scarborough. The Principal of the College, Mr. J. H. Richardson, welcomed the Union to Bradford and hoped that he would have an opportunity to give us a better welcome at some future time when war-time troubles are at an end. He referred to the long connection the College had with the naturalists of Bradford from 1875. It was announced that Dr. H. C. Versey, F.G.S., of the Geological Department, Leeds University, had accepted the office of President of the Union for 1941. The Treasurer, Mr. S. D. Persy Fisher, and the Secretary, Mr. Chris. A. Cheetham, were re-elected. The retiring President, Dr. W. Watson, A.L.S., gave his Presidential Address on ' Yorkshire Associations, Lichenological and Otherwise.' We hope to see this published in *The Naturalist* at a later date.

THE YORKSHIRE NATURALISTS' UNION'S SEVENTY-NINTH ANNUAL REPORT

(Presented at Bradford on Saturday, December 7th, 1940)

The Seventy-eighth Annual Meeting was held at Leeds University on December 2nd, 1939, as the black-out and the restricted travelling facilities made it impossible for the Meeting to be held at Scarborough as intended. The Annual Report was presented there, and was printed as a whole in the January issue of *The Naturalist*.

The Presidential Address on 'The Birds about a part of the Southern County Boundary of Yorkshire' was given by Ralph Chislett, M.B.O.U., and is printed in *The Naturalist* on pp. 123-132.

The Presidency for 1941 has been offered to and accepted by H. C. Versey, D.Sc., F.G.S., of Leeds University.

Field Meetings have been held in 1940 as follows : V.C. 64, Austwick, Whitsuntide, May 11th-13th (see *The Naturalist*, pp. 207-213) ; V.C. 63, Thunder Bridge, Huddersfield, June 1st (see *The Naturalist*, pp. 214-216 ; V.C. 61, Skipwith, June 15th (see *The Naturalist*, 236-238 and 254-255 ; V.C. 65, Redmire, July 6th (see *The Naturalist*, 238-240) ; V.C. 62, Wombleton, August 3rd (see *The Naturalist*, pp. 256-258). Fungus Foray at Kilnsey for Grass Woods, September 14th-19th.

The Excursions for 1941 will be as follows :

May 17th. Roche Abbey for V.C. 63.
Whitsuntide, May 31st to June 2nd. Ingleton, V.C. 64.
June 21st. Tanfield, V.C. 65.
July 12th. Selby-Hemingbrough, V.C. 61.
Aug. 2nd-4th. Hartoft, Pickering, V.C. 62.

The following changes of address have been received :

Mr. A. H. Gander, to 7 North Park Avenue, Roundhay, Leeds 8.
Mr. J. Lord, to Cleveland, Heath Road, Runcorn.
Mr. M. Longbottom, to 65 Ashleigh Street, Keighley.
Prof. W. H. Pearsall, to The University, Sheffield.
Mr. M. Pickles, to 2 Cypress Villas, Wakefield Road, Garforth, Leeds.
Mr. M. P. Ramsay, to 4 High Grove, Welwyn Garden City, Herts.
Mr. L. Smith, to c/o 1 Aylestone Place, Newtown Road, Hereford.
Mrs. D. Tunbridge, to 11 West Parade, West Park, Leeds 6.
Mr. J. Wood, to 9 Raven Street, Keighley.
Rotherham Naturalists—J. S. and C. Griffiths, Thornleigh, Station Road, Swinton, Rotherham.
Scarborough Field Naturalists—Mrs. Farquhar, 34 Franklin Street, Scarborough.

New Members elected during the year :

Mr. Geo. H. Ainsworth, M.R.S.T., 144 Gillshill Road, Hull.
Rev. and Mrs. F. W. Bond, B.A., 25 Jossey Lane, Scawthorpe, Doncaster.
Mr. H. M. Carmichael, Hotham, North Cave, E. Yorks.
Mrs. P. A. Cartmel, 8 West Cliffe Terrace, Harrogate.
Mrs. R. Chislett, Rotherham.
Mr. G. R. Edwards, 5 Eldroth Road, Halifax.
Mr. S. J. Farrer, J.P., Newby Cote, Clapham, Yorks.
Mr. A. Wilson Filmer, Rowley, Little Weighton, Hull.
Mr. J. H. Flint, 3 Christ Church Terrace, Leeds, 12.
Mr. A. Hazelwood, 54 Somerset Road, Bolton, Lancs.
Miss Marion Lee, 25 Richard Street, Rotherham.
Miss H. Lefévre, 9 Saltburn Place, Bradford.
Miss I. M. Longbotham, Stafford Lawn, Halifax.
Mr. J. Lord, M.Sc., 4 Wembley Park Avenue, Hull.

Mr. H. A. Patrick, 1 Peterhof, Harrogate.
Mr. G. B. Reynolds, 43 Chestnut Avenue, Willerby, Hull.
Mr. F. Stell, 19 Cross Green Lane, Halton, Leeds.
Mr. P. Stocks, Camasumary, Breary Lane, Bramhope, Leeds.
Mr. H. Walker, 369 Ring Road, Moortown, Leeds.
Mr. W. Watson, D.Sc., A.L.S., Cedene, Cheddon Road, Taunton.

This satisfactory list of new members is almost wholly due to the effort made by the President (Ralph Chislett), who sent out copies of *The Naturalist* for January with a personal appeal, to names suggested to him by our members and to others known to him.

Resignations :
Mr. H. E. Bentham, Scarborough.
Mr. R. Howarth, Isle of Man.
Miss A. E. Montagu, Windermere.

Obituary.—The death of Dr. T. W. Woodhead removes one whose influence has long helped forward our Union as co-Editor of *The Naturalist* 1903-32 and Secretary 1912-20, and as President in 1922.

The War.—The effort to carry on our activities during the War has proved a success ; the attendance at most of the field meetings was equal to that of pre-War years, and difficulties of accommodation were overcome by the ready assistance of members in the areas visited.

The Naturalist.—This year has witnessed the completion and indexing of the revised Yorkshire Flora (Lees). It is to be hoped that in the future it may be possible to publish the work in book form. Generally, contributions have been of a high order and there has been no dearth of material.

BOTANICAL SECTION

(Chris. A. Cheetham).—A report on Yorkshire botanical matters must first deal with the loss the county has sustained by the death of Dr. T. W. Woodhead, a man whose influence on botanical matters and on the development of our Union during the last forty years is difficult to realize. His influence was specially marked in the direction of ecology, and our Ecological Committee is a permanent record of this fact.

A satisfactory matter is the completion of the publication of the botanical records from Lees' *ms. Vegetation of Yorkshire*. By means of the index in the October issue of *The Naturalist*, our recorders have now available up-to-date knowledge of the known distribution of plants in Yorkshire. This should make it possible for members to see where they can widen the known distribution of many species in the county, and it ought to stimulate local work, especially in less visited districts.

It is to be hoped that other sections—say, Mosses, Liverworts and Algæ—can be revised in the near future, and so brought into line with the Fungi and Flowering Plants.

Correspondents are all impressed with the weather conditions.

Mr. Wattam, writing from Huddersfield, says : The autumn months of 1939 gave a variation of weather types, but taken as a whole mildness was the most pronounced. Frosty conditions commenced on the 28th December, continuing with increasing severity to the evening of the 26th January, 1940, when so intense was the cold that the local registration was 28 degrees F. of frost. Afterwards to the 31st January 16 degrees F. of frost was almost persistent. Severe blizzards produced immense snowdrifts throughout the whole district.

Mr. A. Wilson, at Conway, says : This has been one of the best seasons for flowering plants I have known for a long time, and the foliage and blossom on trees and shrubs was especially good. We had no late

frost and no prolonged or injurious drought. There has been less rain than usual in the mountain area, but more in proportion, and an ample amount, in the coastal districts. June was a very fine warm month, the warmest for many years. Here the mean temperature was 60 deg., or $3\frac{1}{2}$ deg. above the average. July was cool and showery, but August rather warm and dry. Some of the hay crop was secured with difficulty, and in poor condition. The corn crop has been excellent and soon harvested.

Mr. E. G. Highfield (Pickering) says : The year 1940 has been very interesting for observational work on plant life, largely on account of the very severe winter. Frost began on December 22nd, 1939, and held continuously almost until the end of February. Some very low temperatures were recorded, and on the night of January 20th the thermometer fell to −3 degrees F. For most of the period the ground was deeply covered with snow, and when the thaw came in March it was evident that the frost was very deep in the ground. In consequence the early spring flowers were greatly delayed, and by the end of March scarcely anything was in bloom except snowdrops and aconites. Sweet violets, *Omphalodes verna* and *Gagea lutea*, when they did flower in April, were very poor. It soon became noticeable that many shrubs had found the winter very detrimental to them. In the gardens shrubby veronica buddleia, spotted laurel and cupressus were in a bad way, and many of them have since died. It was, however, surprising to find that such a hardy plant as the gorse had been a victim of the frost, but everywhere gorse was brown and there was scarcely any bloom. Later observation has shown that it was only the old wood that suffered, and now, at the end of the season, there is seen to be plenty of vitality in the new growth.

This remark of Mr. Highfield about gorse was in accord with other members' observations, but in some instances no sign of life has been noted in the plants.

Mr. A. Malins Smith, from Shipley, continues the story to October : The outstanding features were the great frost and the great drought. In this district, save for a wet week or ten days beginning on the 10th July, dry and sunny weather has prevailed throughout the summer up to the time of writing.

Mr. E. R. Cross, from Scarborough, says : After the most severe winter we have had for many years we had an exceedingly dry hot spring, many weeks no rain falling, followed in this district by a cool autumn. On account of the dry weather the strawberry crop was a complete failure. Plums and apples were very abundant, and all wild fruits were prolific.

At Austwick the snowfall came after a prolonged frost and so fell on hard frozen ground which did not get soaked as the snow cleared away. This, and the drought which followed, checked the growth of the grass, and the hay crop was late and poor. This lack of moisture affected most plants, and the dry and, later, hot weather brought flowers quickly into bloom and as quickly into fruit, so that if an observer missed this short flowering period it appeared to him to be a season lacking bloom.

Spring flowers were late owing to the frost and snow. I did not see flowers on the Opposite-leaved Saxifrage on Pen-y-ghent until March 28th, but then it was well out though there was no bloom on March 18th. Celandines and Coltsfoot were some three weeks late this year ; later on this leeway was recovered, and the Cloudberry fruits were three weeks earlier than has been the rule. Other fruits, like Blackberries, were also very early. A good many instances of second flowerings have been noted, such as Honeysuckle, Wild rose, Blackberry and Laburnum, and many farmers have got a second crop from their hay fields.

Mr. A. Malins Smith says : The flowering time of wild herbaceous plants was brief, and they hurried through it to an abundant fruiting. Orchids flowered very badly, flowering spikes being both few and small.

The Adder's Tongue and Moonwort ferns were adversely affected, being absent from one field where they have occurred regularly for many years. A curious effect of the drought in hilly pastures was the stunted growth of Devil's Bit Scabious, which frequently flowered on stems only one quarter to one-third of the normal length. Its flowering was delayed. In one pasture on July 27th, Devil's Bit showed only leaves, not even young inflorescences being present. Burnet Saxifrage, in the same field, was normal both in abundance and size of inflorescence. This difference probably pointed to a deeper rooting habit in the Burnet Saxifrage. *Linum catharticum* was very scarce at its normal time of flowering but abundant some weeks later on August 17th. It seems likely that owing to drought the seeds of this annual did not germinate until after the rainy week in July.

Spring flowering was late after the frost. I saw my first coltsfoot flower on March 16th and my first celandine on March 25th. As the dry and sunny season proceeded, flowering became relatively early. I saw my first wild rose on June 12th. This tendency continued through the season, except for those such as I have specially mentioned whose flowering was delayed by drought.

An outstanding occurrence was the flowering of the scented rush, *Acorus calamus*. It was brought to me in flower from a pond at Bingley, and later I found several flowering spikes by the canal above Bingley. Of species that are too rare to influence the general picture, Tutsan has had no fruit, Hornbeam a few tassels, Maple an odd samara here and there, while Lime is variable, some good, some barren.

A tree of *Robinia Pseudo-Acacia* in Saltaire Park has cropped heavily, an unusual occurrence.

The only native tree noticeably injured by the great frost in this district was the beech. Many beech trees had numerous dead twigs and buds, and such trees during the summer showed a curious mixture of large and small leaves. The large leaves were produced by the buds of the previous year, and the small leaves were on shoots produced from buds of the current year, which grew out a year before their normal time in order to increase the reduced leaf-area of the tree.

This seems to be noticed by Mr. Wattam, who says : A curious feature noted in several of our local woodlands was the development of the leaf buds on the lateral branches of the Beech, especially on the trees on the outer fringe of the wood, only the apical bud developing into foliage and on other branches three or four buds only developed foliage, the apical bud becoming dead. A puzzling feature has been provided by the Ash, Sycamore and Birch, each of which gave a very fine display of blossom, but the resultant fruitage yield was only moderate and not at all in comparison with the blossom promise.

Mr. Highfield says : The season from April onwards has been particularly good, and most flowering plants and trees have done well, blossom and fruit have been abundant. The orchids, however, have not been at their best this year. Early purple and green wing did well at the start, but all the later kinds have been scarce and poor in bloom. The burnt tip (*Orchis ustulata*) seems to have vanished from this district ; fly orchids are becoming very scarce ; the bee orchids, for the second season in succession, were burnt out by a spell of hot sun and drought in June and have not produced any flowers ; butterfly and frog orchids did well in the woods but were very impoverished in open places ; marsh orchid and fragrant orchid were normal, but marsh helleborine produced very little bloom.

The really common plants have thrived abundantly, and in this district there have been some magnificent displays of ragwort, thistle and rosebay willow herb. If any steps are being taken by agriculturalists to reduce these pests it is evident that they are ineffectual.

Tree foliage has been very dense ; there have been no droughts or

late frosts, and insect pests have not been much in evidence. Beeches are very full of mast, but the seed cases are nearly all empty. Acorns are not so abundant as last year.

There is no indication that any of the trees suffered directly by the frost, but in many woods young trees were completely ringed by animals during the cold spell. One group has been kept under observation during the season. The trees most usually attacked by the animals are sycamore, ash, beech. Oak is never touched, and pine only rarely near the roots. About a dozen young sycamore trees, with trunks varying from 6 in. to 15 in. in diameter, have had the bark stripped completely for a height of 2 ft. above the ground. The teeth marks of the animals make a criss-cross pattern on the wood. These trees, however, seem to have had a perfectly normal season ; they are full of leaf and show no sign of dead wood, but an old mountain ash which has been ringed is now almost dead except near the top, where it has managed to mature a few bunches of red berries.

Mr. Wattam's estimate of the fruitage for the year in the Huddersfield district is :

Excellent.	*Good.*	*Moderate.*	*Poor.*
Pear.	Ash.	Sycamore.	Hazel.
Apples, wild and cultivated.	Pedunculate Oak.	Birch.	Lime.
Elm.		Sessile Oak.	
Elder.		Bilberry.	
Beech.		Crowberry.	
Horse Chestnut.		Cloudberry.	
Mountain Ash.		Field and Dog Rose.	
Hawthorn.		Holly.	
Alder.		Wild Cherry.	
Bramble.			

Mr. Malins Smith gives the following for the Shipley area :

Abundant.	*Good.*	*Moderate.*	*Poor.*
Mountain Ash.	Honeysuckle.	Oak.	Ash.
Hawthorn.	Elder.	Sycamore.	Beech.
Alder.	Raspberry.	Wild Apple.	Holly.
Elm.	Horse Chest-	Blackberry.	Hazel.
Woody Nightshade.	nut.	Guelder Rose.	Sloe.
Cultivated Apples.	Field Rose.		Black Bryony.
Cultivated Plums.			Downy Rose.
Cuckoo Pint.			

Other opinions are in agreement generally regarding the fruitage of the trees. All point to the Hawthorn, Mountain Ash, Elder as very abundant, and to Ash, Beech, Sycamore as poor. Other species may be summed up as normal, with slight variations in different districts ; the Hawthorn flowered very early, and the bloom was mostly over before June. Some difference of opinion was expressed on the Oak. Mr. Malins Smith says : As a higher estimate of the acorn crop than mine had been expressed, I tested the matter by estimating the crops on forty trees in Shipley Glen taken at random. Twenty of these were near the stream and twenty on the drier hillside about half a mile away. The results were :

	Good.	*Moderate.*	*Few.*	*None.*
20 in wetter situation	2	4	5	9
20 in drier situation	—	1	3	16

The result shows the effect of situation in this dry year, and also the high proportion of barren trees—25 out of 40. In Northcliff Woods the whole wood resembled the drier situation of Shipley Glen, with a very high proportion of barren trees and no trees with a heavy crop. Although,

therefore, Beckfoot golf links showed a number of large trees with good crops, yet the general crop cannot be put higher than moderate.

Mr. J. W. H. Johnson refers to the Forage crops : The grass crops were light owing to the lack of rain, but harvested quickly. The rain in July assured a better turnip crop than usual ; Barley and Oats were light crops and short-stalked ; the Wheat was good. Onions started well but have since ' died off.' The Reedmace (*Typha*) has fruited in the River Calder at Wakefield Bridge, and Mr. Wattam refers to the Bilberry, Black Crowberry, Bramble and Cloudberry which he thinks moderate. On Pen-y-ghent the latter were plentiful and some three weeks early. The amount of fruit on the Cuckoo Pint has caused comment. Mr. E. R. Cross, of Scarborough, notes some interesting plants.

Lastrea œmula, rediscovered last year, was found this year in fair numbers. A large patch of *Orobanche elatior* has occurred for some years, and was abundant. *Sambucus Ebulus* did well at Pickering. The *Rosa villosa* was a magnificent sight on the moors both in bloom and fruit. Large masses of *Trientalis europaea* grew at Hackness, and covered many square yards with its delicate blossoms. *Peucedanum Ostruthium* seems to have disappeared from the district. I have also been unable to find *Lycopodium clavatum* (which grew in several places on the moors) in recent years.

The May Lily, *Maianthemum bifolium* Schm., failed to bloom in its old station, although leaves were found in abundance, the wood in which it grows having been cut down. A patch moved some fifty years ago bloomed well.

Andromeda polifolia, although very few plants, bloomed beautifully, and was an exceedingly fine sight. Most of the orchids flourished ; the Burnt Tip, *Orchis ustulata*, was more abundant than usual. The Marsh Helleborine, *Epipactis palustris*, seems to be increasing in two or three localities.

Cephalanthera ensifolia is not doing well in Forge Valley, but occurs in one other locality in fair numbers.

Secondary growth on the trees has been slight this year. It is many years since this has been noted. Mr. A. Wilson suggests a reason. He says : I have seen very little secondary growth ; there was no check to the primary growth.

Mushrooms have been fairly plentiful, and some other species of fungi have been more abundant than for the last two or three years.

Botanical Records Committee (W. A. Sledge) : With restrictions in the opportunities for travel and the temporary absence on military duties of two of our most energetic members, Miss Rob and Mr. Shaw, work on systematic botany has been curtailed and fewer records have been made. The reports of the Union's excursions show that, while many interesting species have been noted no new records have been added to our lists. Mr. Highfield records *Phegopteris Robertiana* Braun. from the railway track in Newton Dale. There is no previous record for this fern in North East Yorkshire. From the Pickering area I have also received specimens of *Cuscuta epithymum* Murr.

My own botanising has been restricted to a few excursions, mostly during August, but some very interesting plants have been seen. At Fenwick, near Askern, *Sison Amomum* L. was gathered in the same lane where *Lactuca virosa* L. grows. The former is recorded in Lees' *Flora* from the Smeaton and Adwick-le-Street areas, and the few records there given comprised the most northerly indigenous stations for this species in Britain. In the *Supplement to the Floras* Lees dismisses it as a casual but I see no reason to doubt its native status with us on the magnesian limestone in South Yorkshire. During the same excursion *Dipsacus pilosus* L. was seen in flower at Wentbridge in the locality where it had been found during the Y.N.U. excursion last year. *Lathyrus latifolius* L.

was also found growing in a cornfield hedge far from any houses, between Little Smeaton and Askern. Other notable plants seen include *Potamogeton Cooperi* Fryer (*P. crispus* × *perfoliatus*) from the River Wharfe at Ben Rhydding, where it was first found many years ago by Mr. A. Wilson ; and a hybrid Willow herb from a field near Garforth, *Ep. hirsutum* × *tetragonum*. This hybrid is one of the rarest in the country, and the presence of very large numbers of *E. tetragonum* L. is itself a record of considerable interest as so few stations for this species have been listed for Yorkshire. A notice has already appeared in *The Naturalist* recording the finding of *Malaxis paludosa* (L.) Sw., and *Juncus nodulosus* Wahl. in Teesdale.

Ecological Committee (Miss D. Hilary) :—Mr. Wattam has continued his experiments on the growth of Juniper from seed. The chief result is that while good growth has been made by the seedlings in the soil of his garden, seedlings grown in the soil brought from the Moughton Juniper area have made no advance, although they are still alive. It is also interesting to note that in one set of pot-bound seedlings, the great frost caused a purplish colouration and pensile growing points. This latter combination of features is frequently seen on Moughton Fell and may be there also an effect of low temperature.

Mr. Wattam examined the whole Juniper area, both dead and flourishing portions, and found no seedlings. He supports Dr. Pearsall's idea that the wholesale dying out of the Juniper may be due to drought.

The Huddersfield naturalists have been engaged upon a re-survey of West Wood, Honley, first mapped for ecological purposes in 1902 by the late Dr. Woodhead and Mr. Wattam. The current war restrictions against mapping have, however, retarded the progress of this work. The wood is upon the coal measures and will doubtless show interesting comparisons with the survey of Dean Wood, Netherton, which the members of the Huddersfield Naturalists previously mapped. Comparison with the 1902 maps will also doubtless show interesting facts.

Mr. Flintoff is working on the distribution of the plants of the Hole of Horcum with special reference to *Cornus suecica*. His report is at present of an interim character, and when the more permanent results which Mr. Flintoff foreshadows are obtained these very useful results will be recorded by the Section. It is a pleasure to think of this and the other pieces of ecological work which are still being pushed forward in these very difficult times.

Mr. A. Malins Smith adds :—No field meeting of the Ecology Committee has been held this year, but the Chairman of the Committee spent a week's holiday at Austwick in August, and with the Secretary of the Union made a careful inspection of (1) the special plots, (2) the whole Juniper area.

The outstanding feature of the survey, and it has been already mentioned in the Ecology report of the Whitsuntide meeting, is the death of the Juniper bushes over an area south-east of Thieves Moss extending to roughly half the whole Juniper area of Moughton Fell. The area of healthy bushes near Thieves Moss, where observations of size and condition were going on so recently as 1935, is now a wilderness of dead bushes. Following the disappearance of Juniper from Long Scar which was obvious in our earlier visits, this looks like a further extension of some Juniper pestilence slowly sweeping along in a south-easterly direction. Closer observation, however, shows that this is not a complete picture, for the Juniper has died also on the eastern or Horton side itself, and it is important to note that in the best area of all in and near Juniper valley where the plots are, the record is one of continuous dying off. Here and there on the plots, at intervals a bush has died and the changes in the Juniper have all been in the direction of death and not of growth. Thus the process over the whole area is the same

and is the same as that noted at the Horton meeting of 1930 which led to the formation of the Ecology Committee. It is not the purpose of this report to discuss the cause of this large-scale failure of the Juniper, but careful observation of the position of the surviving bushes in this moribund area did not show that they were either on deeper soil, or in moister places or more sheltered places, as the survivors should have been if the cause of death was drying out. Neither were the surviving bushes in places protected from rabbit attack. The surviving bushes indeed seemed to be dotted about in a haphazard way which did not give any clue to their survival.

Two years ago certain new plots were made on which artificial fertilisers were used. Unfortunately no visit could be paid last year, and so the first year's results, which are always the most important for artificial fertilisers, could not be observed. After two years the grass of the plots receiving both phosphate and nitrogen was to some degree improved, while no improvement was shown on the plot receiving nitrogen only. No effect on the Juniper was visible.

A new plot was bared on the limestone last year by the Secretary of the Union and its progress is being observed. So far it shows two plants which have not been found on any of our plots before, though they are found in the Moughton area, *Gentiana Amarella* and *Arenaria verna*.

The seedling Junipers on Plot 4, which were protected by wire netting in 1937, have all now disappeared. They were growing under a healthy mature bush and among a closed association of Bilberry, Crowberry, Wood Sorrel and mosses. Since they did not succumb to rabbit attack it seems certain that they failed to survive in competition with the plants already established. The Bilberry is much taller and stronger since the netting was fixed, and has probably so reduced the amount of light reaching the small Juniper seedlings that there was not enough for their requirements.

Bryology (F. E. Milsom) :—The past year has, as might have been expected, been a lean one, at least as far as field work is concerned. The meeting at Austwick at Whitsun was, however, a success, in spite of the ground having been so well worked before. Two new localities for *Orthodontium gracile* var. *heterocarpum* were found, perhaps out of compliment to the President, who originally named the variety ! Two other interesting plants have also been found at Austwick this year, *Fissidens exilis* and *Weisia mucronata* var. *subgymnostoma*, the latter being a new record for V.C.64.

Dr. Bedford has contributed two valuable papers, one on the fruiting of *Breutelia arcuata* in Yorkshire, and the other on a new locality for *Hypnum crista-castrensis*, together with a survey of information on its previous appearances in the county.

Among other general bryological records may be quoted Mr. Thompson's interesting account of the Sphagna of the Sheffield district.

Mycology (Miss J. Grainger) :—Despite war conditions the Committee maintains its activities not only in respect of the annual Foray, this year held at Kilnsey, September 14th-18th, but in the individual activities of its members.

The chairman delivered his address at Kilnsey on ' The Historical Ecology of Fungi.' He quoted from the work of James Bolton, 1787, to show that the fungus flora is not static but has changed during the last 160 years.

Papers published by members of the Mycological Committee during the year include :

Petch, T. : ' Notes on Entomogenous Fungi.' *Trans. Brit. Mycol. Soc.*, Vol. 23, Part 2, pp. 127-148. July, 1939.

Pearson, A. A. : 'Agarics at Aviemore.' *Ibid.*, Vol. 23, Part 4, pp. 307-312. December, 1939.
Petch, T. : ' Tuberculariа.' *Ibid.*, Vol. 24, Part 1, pp. 33-58. June, 1940.
Grainger, J. : ' Distribution of the Larger Fungi in Relation to Relative Acidity of the Soil.' *The Naturalist*, pp. 137-141. June, 1940.
Petch, T. : ' Xylaria.' *Ibid.*, pp. 153-156. June, 1940.
Lind, E. M. : ' Notes on the Distribution of Woodland Fungi in Relation to Certain Soil Types.' *The Naturalist*, pp. 101-102. April, 1940.

Additions to the Tolson Memorial Museum Herbarium have been made by both recorders during the year.

In spite of war activities it has been possible to add nearly 100 tests of soil acidity to those already reported in *The Naturalist*. This work has been prosecuted mainly in the Huddersfield District and at the Fungus Foray.

The following new records have been added during the year :

New to County.

Entyloma ranunculus Schroet.
Hymenochaete cinnamomea (Pers.) Bres.
Astrosporina praetervisa (Quel.) Schroet. Buttercrambe 29-10-1939 (det. Miss Wakefield, Kew), V.C.62.
Pleurotus atrocoeruleus. Huby, York, 12-11-1939 (det. Miss Wakefield), V.C.62.
Tulasnella violæ (Quel.) B. & G. Nunappleton, York, 3-12-1939 (det. A. A. Pearson), V.C. 64.
Radulum mucidum (Pers.) B. & G. Becca Park, Aberford, 9-10-1938 (det. A. A. Pearson), V.C. 64. Similar specimens from Askham Bog, 16-10-1938.
Trametes rubescens (A. & S.) Fr. Askham Bog, York (det. Miss Wakefield), 1938-40. V.C.64.
Neopeckia fulcita (Bucknall) Sacc. Steeton, Tadcaster (det. T. Petch), October, 1938. A Pyrenomycete.

New to Vice County 61.

Plasmopara pusilla (de Bary) Schroet.
Peronospora alsinearum Casp.
P. ficariæ Ful.
Empusa muscae Cohn.
Hypocrea pulvinata Fckl.
Diatrypella favacea (Fr.) Ces. and de Not. — *verruciformis* (Ehr.) Mts.
Peniophora incarnata (Pers.) Cke. Millington Springs, Pocklington, 10-6-39.
P. cinerea (Fr.) Cke., Pocklington, 10-6-39.

New to Vice County 62.

Uromyces Pisi (Pers.) Wint. II, III on Lathyrus. Huby, York, 12-11-39.
Collybia ambusta Fr. (det. Miss Wakefield). Huby, York, 12-11-39.

New to Vice County 64.

Tapesia fusca (Pers.) Fckl.
Leptosphæria derasa (B. & Br.) Auersw.
Ophiobolus acuminatus (Sow.) Duby.
Diaporthe leiphæmia (Fr.) Sacc.
Cryptospora suffusa (Fr.) Tul.
Peniophora pallidula Bres. (Det. Miss Wakefield). Nunappleton, York, 3-12-39.

New to Vice County 65.

Peronospora grisea Unger.
P. ficariæ Ful.
Diaporthe leiphæmia (Fr.) Sacc.
Hypoxylon coccineum Bull.
Puccinia holcina Erickos.

VERTEBRATE ZOOLOGY SECTION

MAMMALS, REPTILES, AMPHIBIANS AND FISHES

Mammalia (Mrs. A. Hazlewood) :—Chiroptera—Mr. Taylor reports that the Whiskered, Pipistrelle, Long-eared, Noctule and Daubenton's Bats all occur in the York district.

Insectivora.—The bad winter weather seems to have had little if any effect on the Hedgehog, which is reported in its usual numbers for York, Rotherham, Keighley and Leeds. Mr. Chislett mentions that the species seems to have been more noticeable than usual, possibly due to the drought of spring, and one developed a habit of visiting his bird bath, which is a stone vessel on ground level, just after dusk for a drink. Mr. Booth suggests that Hedgehogs are in reduced numbers around Ben Rhydding and Ilkley, but friends in neighbouring districts report them to be as numerous as usual. A fairly large store in Ilkley put their discarded packing straw into a shed, almost in the centre of Ilkley. In July they disposed of this accumulation to a local farmer. The following morning the farmer's wife brought back a Hedgehog's nest containing five living young ones that they had found in the straw. They did not know what to do with them, so they put it down intact in a small paddock quite near to the shed. The mother Hedgehog evidently found them ; anyhow they disappeared from the nest and were never seen again ! Moles have had a hard time through the lack of rain, and many have died in the open around York. A large albino mole is recorded (see *The Naturalist*, p. 146) from Catton Hall, near Thirsk, on March 7th. A friend of Mr. Booth who has a fairly large private garden in Ben Rhydding and who keeps two gardeners, informed him that Moles have greatly increased in his garden this year and are a great nuisance. This, however, appears to be an exceptional experience this season. A Lesser Shrew was caught at Burniston by Miss Thomas on April 15th, but I have no notes on the effect which the early unusual weather has had on this minute species.

Carnivora.—Mr. Booth suggests that Foxes, more especially the so-called Hill Foxes, will have had a pretty lean time of it this year. Mr. Taylor reports that when motoring recently near York, a Stoat and Brown Rat were seen to emerge from the grass verge and commence sparring in the road, each attacking the other in turn and leaping to avoid the counter-attack. Their attention was so taken up that they took no notice of the approaching car, and the rat was killed. The Stoat circled round the Rat a few times with its fur bristling and then made off. At Keighley, Mr. Edmondson suggests that Stoats there seem to be in about the usual numbers, but that there are fewer Weasels about. Mr. Booth has been informed on fairly good authority that Weasels suffered very much in the almost Arctic weather early in the year. Mr. J. Thompson, of Keighley, shot an Otter in March measuring 36 inches overall, on the banks of the River Aire, near Silsden. It was eating a large Chub at the time. The Badger has been much reduced in numbers in one ancient haunt near York, where fourteen have been killed in the last three years, and the colony is now reduced to a single wary specimen. On other estates their numbers remain fairly constant. Badgers also maintain their numbers in the Scarborough district, and

Mr. A. S. Frank informed Mr. Clarke that he saw the tracks of two Badgers in 6 inches of snow near Egton Bridge on February 21st, when they should have been hibernating. Mr. Clarke reports that Bonzo, the Grey Seal well known at Filey, died on August 13th after fourteen years in captivity. At the time of death he weighed 17 stones and measured 7 ft. 6 in. in length. He was caught as a pup on Filey Brigg.

Rodentia.—The Red Squirrel occurs at Parlington (Aberford) along with the Grey Squirrel. The Red Squirrel is still very scarce in the Ben Rhydding district, and no increase has been noted. It is rarely seen in places where it was formerly quite common. Around Scarborough it continues to be scarce ; only one has been reported in the district, seen by Mr. D. W. Bevan at Silpho Moor on April 28th. This species is no longer seen in the York district, although the Grey Squirrel occurs commonly, but its numbers are being reduced by gamekeepers who add the corpses to the collections of vermin. A pair have several times been reported in the Myddelton Woods—on the opposite side of the River Wharfe from Ilkley. Otherwise this imported species makes very slow progress in its advance to Upper Wharfedale and Upper Airedale. Mr. J. E. Marson reports that in the bitter weather of early February he had found five Brown Rats either starved or frozen to death in a ' run ' about a foot below the ground, near Bradford. Mr. Smith records a large number of Short-tailed Field Voles around York, and they are reported to have been in their usual numbers around Scarborough. The severe frost in the early part of the year did not seem to affect them, for they tunnelled beneath the snow and were quite happy. They are reported as having been numerous in the Egton district. Mr. Edmondson thinks there are more Rabbits than ever this year around Keighley, not only on the lowlands, but right up on the highlands. Around Rotherham their numbers seemed much reduced this summer ; Mr. Booth thinks that both Rabbits and Hares have suffered severely. On January 22nd a wild Rabbit was caught in Lister Park, Bradford, during heavy snow.

Reptilia (Mrs. A. Hazelwood) :—Mr. Pickles says that Grass Snakes were found in the Vicarage garden at Aberford when the gardener was removing a dung heap.

Amphibia (Mrs. A. Hazelwood) :—Frog spawn was noted at Saltaire on March 6th and at Ben Rhydding on March 8th.

The Great Crested Newt is reported from Lotherton, Aberford. Palmated Newts are reported as common in Wood Pond, Fulneck, near Pudsey (Mr. J. E. Marson).

Pisces (Mrs. A. Hazlewood) :—Few fish have come under the notice of Mr. Clarke during the year owing to war conditions. Most of the trawling is stopped, and access to the fish market is banned by the military, so observations have been very few.

Chondropterygii.—The Angel Fish is not often seen off the Yorkshire coast. One about 3 ft. in length was trawled near Scarborough on April 16th.

Anacanthini.—A Turbot, brown on both sides, was landed at Whitby on July 24th. It measured 23½ in. in length and weighed 9 lb. A marked specimen of Plaice landed on April 6th had been liberated off the Suffolk coast on October 5th, 1937. It was caught 14 miles N.E. off Whitby and had increased in size by 1⅛ in. A specimen of Burbot (the only fresh-water member of the Cod family) was caught in the Derwent near Thornton Marshes on January 9th. It was a female in spawn, measuring 18 in. in length and weighing 1 lb. 13½ oz.

Physostomi.—A year or two ago three or four ½ lb. Trout were seen in a beck near Bolton Percy. This year there are a few more smaller ones. This beck dries up except for a few pools. The Trout seem to

stay in one deepish pool and are not seen anywhere else. Many fine Brown Trout have been caught in the River Aire near Skipton this season ; several fish weighing from 2 lb. to over 4 lb. have been reported. This may be due to the fact that Minnows were so numerous in the River Aire near Skipton this year that anglers described them as a ' plague.' Several Thwaite Shads have been landed during the year at Scarborough. Three were caught on February 23rd, four others on March 26th, and eight on April 4th. All were trawled, and the largest measured 18 in. in length.

Mr. Smith reports that a new fish pass has been constructed in the River Derwent at Elvington by the River Ouse Catchment Board in co-operation with the Yorkshire Fishery Board ; this is the most modern type of ' salmon ladder ' situate at the highest tidal reach of the River Derwent, and when the next step is finished at the weir obstruction of Stamford Bridge, the whole of the river and its tributaries will be opened up for salmon fishing development. The war has held up the complete scheme and we look forward to the time when it is possible to achieve the main object.

General Observations.—An unusually severe winter commenced on the last few days of 1939 and continued throughout January, with keen frosts and heavy falls of snow until the first week in February when a thaw commenced ; but it was not until the end of that month that the snow was clear, excepting where the deepest and sheltered drifts had been. Isolated villages in the Wharfedale valley were entirely cut off for five weeks, and the villagers were forced to live upon their reserve supplies. There are no such rough and ready means of assessing to what extent the wild animals suffered, and time alone will show.

In conclusion I wish to record my grateful thanks to Messrs. H. B. Booth (Ben Rhydding), E. W. Taylor and S. H. Smith (York), R. Chislett (Rotherham), W. Pickles (Leeds), F. H. Edmondson (Keighley), W. G. Bramley (Bolton Percy), and W. J. Clarke (Scarborough), who have made this report possible. Mr. Clarke sent me the whole fish report for the North Riding.

ORNITHOLOGY

(Ralph Chislett).—Ornithologists in Yorkshire are endeavouring to set their house in order, and a few words are necessary explanatory of changes.

At the Meeting of the Vertebrate Section held February 10th, 1940, it was declared desirable for a Committee for Ornithology to be constituted. Hitherto no mention of Ornithology has appeared in the constitution of the Union, or on the card of Membership, although the preponderating interest of the majority of members of the Vertebrate Section has been, and is, ornithological. Some of us have felt for years that some change was needed. It will be the business of the Committee to see that our Reports, our contributions to British Ornithology, are worthy of the County and of the Union.

At the same meeting it was further decided to be desirable for the Annual Reports of the Committee to cover the calendar year. Hitherto Ornithological Reports of the Vertebrate Section have of necessity ended with September, with the autumnal migration movements still proceeding, since they had to be read at the Section's October Meeting. The unfortunate time of this break has resulted in the appearance of important records of the same movement in the reports of two years ; and not infrequently in the oversight of facts noted between September and December when the second year's notes were due to be sent in. As the Vertebrate Section (and the Committee for Ornithology) will have a meeting each year in February, the calendar year's Ornithological Reports will be read and passed at that meeting for publication (it is hoped) in

the April *Naturalist*. To this proposal the Secretary of the Union stipulated that there should be a short report in general terms available for the Union's Annual Report.

More perhaps than the work of any other department has that of the ornithologists been affected by the War. Reports from all quarters tell of the difficulties experienced in the field. Holderness and Spurn have been unapproachable, with the consequent interruption of the useful migrational observation being developed there. Permission to visit reservoirs has been refused. Military needs have made it impossible to visit some inland haunts of birds. To these handicaps must be added those of time and transport available. A number of ornithological members of the Union are on active service ; others are engaged on government research work, and with other special duties, or with extra work caused by the War.

In view of the foregoing it may be considered a matter for surprise that I am able to report a good deal of quiet work ; and many interesting records will be found in the Reports to be passed in February. Plans for the revision of *The Birds of Yorkshire* have necessarily been retarded but certainly not abandoned. Our Recorders (Messrs. H. B. Booth, W. J. Clarke and C. W. Mason) are still accumulating records for 1940. Publication of our correlated, individual notes enhances the value of the work of all of us. It may not be out of place here to ask that sight records of unusual and difficult species be accompanied by notes of the circumstances, and of the means whereby identification was made certain.

The year 1940 will be remembered for the severity of the early months, and for the fineness of the summer following. Both had effects on bird life. Some of the effects of the frost and snow have already been reported in *The Naturalist* (see articles by G. H. Ainsworth and J. Lord, E. W. Taylor, W. J. Clarke, J. P. Uttley, T. Hyde-Parker, S. Moorhouse, and W. W. Nicholas. Mr. A. Hazelwood's appeal for any birds found dead to be sent to him came very timely, just before the frost, and was well answered at the time. His report will contain some valuable matter. Mr. Hazelwood asks that members will continue to send him the birds they find dead, and so possibly help to throw further light on the difficult problem of sub-species of foreign origin visiting Yorkshire.

Ornithologists were present at several of the Union's field meetings (see reports in *The Naturalist*). Recently published ringing records include several of special interest to Yorkshire.

Notes from resident Yorkshiremen, and from visitors to the county on holiday, are reaching me for passing to the Recorder for the appropriate Riding. The Halifax ornithologists have maintained their work in spite of difficulties, and have even added to the long list of migrant species visiting their district with records of Spotted Redshank and Black-tailed Godwit at sewage farms. G. H. Ainsworth has done well in spite of the absence of his colleague, J. Lord.

I can claim with confidence for the first Report of the Committee for Ornithology that if not completely adequate it will contain many records of interest and value, and will be far more comprehensive than the state of the times in which we live might lead us to expect. Tarns in the hills of the North and West have been sought during the migration season in lieu of the Humber flats ; reservoirs, woods and commons have been visited in spite of the lack of official permission, by the exercise of common sense on the part of both ornithologists and those on guard. Will everyone please continue to do what work they can, to send in their notes to our Recorders up to December 31st, and so help to maintain the continuity of our work.

Wild Birds and Eggs Protection Acts Committee (C. F. Procter and R. Chislett) :—The work of the Committee has proceeded in spite of great difficulties.

Montagu's Harriers were seen in the summer in the North Riding, and Mr. W. J. Clarke reports that eggs were robbed. There is also good evidence that a pair had young in July ; and R. M. Garnett saw an adult female (or a young bird) as late as August 24th. A gratuity paid will also reflect favourably upon next year.

Nothing definite transpired as to the presence of the Stone Curlew in its old breeding haunts.

At Hornsea Mere, our watcher, J. W. Medcalf, reports a mixed season. Herons were late in nesting owing to the hard weather ; and although there were 21 nests many young birds perished. A pair of visiting Bitterns died eventually. Small birds and Coots suffered severely, and neither Wren nor Blue-tit was seen this year. A pair of Kingfishers nested successfully. Green Woodpeckers, Bullfinches and Goldfinches bred successfully in normal numbers. Great Crested Grebes brought off two broods but only three young appeared to survive. Ducks had a good nesting season. Generally it is to be feared that the highly militarised state of the district has adversely affected the bird life ; but the season was a late one and thousands of birds had died in the frost.

At Bempton and Speeton no climbing was done. The coast has been constantly patrolled. As far as can be ascertained bird life on the cliffs was normal as compared with recent years. It is hoped the birds may show benefit from this quiet season in another year.

As was to be expected Spurn has had the most military attention. A road has been driven along the Isthmus. In spite of all, the Little Terns and Ringed Plovers had a normal year. It was not possible to count nests, but numbers were approximately as in recent years. Our watcher at Spurn, John Clubley, is serving with the Forces.

Action again was taken successfully under the W.B.P. Acts in the East Riding.

CONCHOLOGICAL SECTION

(Mrs. E. M. Morehouse) :—The number of records for conchology are very few. During the foregoing twelve months, due to two reasons. Our workers have had their time fully-occupied with the many activities at present so much in evidence, thus leaving little leisure for the more restful pursuit of looking for land and freshwater mollusca. Again when many of us could have gone into the field, travel facilities and the extreme hot and dry weather proved very real obstacles if we wanted to go a distance to some of our favourite habitats, and so we were left only with investigations not far from our residential quarters.

My own experience has been very meagre. Around Doncaster I have not seen anything worth recording, even in my own garden there have been very few slugs and *H. aspersa* Müll. In past seasons the slugs have been terrible pests. My notes on Austwick have already appeared in *The Naturalist*.

Mr. W. Thurgood reports he and Mrs. Thurgood took a bag on November 18th, 1939, of seven different species, he remarks, ' it was a fine mild day at Kirkham Abbey.'

On April 13th, 1940, they found *H. nemoralis* v. *undulata*, Gentiluomo, also v. *albolabiata*, Von Martens, and v. *roseolabiata* Taylor between Garforth and Garforth Bridge.

On May 27th, 1940, in the Dearne and Dove Canal, Barnsley, they took eleven species, including *Vivipara vivipara* L., *Unio pictorum* L., and *Driessensia polymorpha* Pallas.

Mr. J. C. North found several *Azeca tridens* Pulteney and v. *alba* Jeffreys in the old habitat, Reynard Ings, Addingham, in March.

Mr. Arthur Smith, York, writes his activities have been much curtailed. On two separate occasions he visited the old station for *A. arbustorum* v. *baylei* Moq-Tan at Bishopthorpe, but found nothing, not even a type,

although the weather was favourable, so it looks like extinction of the species in this locality.

Nearer York the colony of *H. nemoralis* L. still survives, several forms were taken. Askham Bog was visited twice but with little success. '*L. stagnalis* L. has disappeared and only miserable samples of *L. pereger* Müll. were to be seen, it is possible the dry season may account for this, there has been very little water in the ditches all the summer.' At Garrowby in August ' large numbers of *T. cantiana* Montagu, *A. arbustorum* L., and a fair quantity of *H. itala* L., *H. caperata* Montagu. were seen. On an old log many *C. laminata* Montagu. were thriving.' It is from Garrowby Mr. Smith obtains the beautiful form of *H. nemoralis* v. *rubra* Baudon. He writes : ' In the brick ponds at Acomb in early September, *L. stagnalis* L., *P. corneus* L., and *P. contortus* L. were fairly common, the latter swarmed in the shallower splashes, along with *Physa hypnorum* L. *L. pereger* Müll was scarce and small.'

While sorting some moss from Forge Valley, Mr. Smith found 11 *A. lineata* Drap., 5 *V. substriata* Jeff., and a number of *C. minimun* Müll.

Mr. C. F. Sweetman, York, sends a list of 19 species taken when the Y.N.U. were at Redmire, included are *V. radiatula* Alder, *Zonitoides nitidus* Müll., *Vallonia pulchella* Müll., and *Azeca tridens* Pulteney. The *C. laminata* Montagu. were shorter than usual by 2 mm., and plumper. Given good conditions this area must be a happy hunting ground. Included in the report is a diagram of the distribution of *Acanthinula aculeata* Müll. It radiates to about twenty miles from York. Ripon and the Hole of Horcum are outside the circle. In all twelve habitats are given ; it shows a good distribution. I hope this diagram may appear in *The Naturalist* in the near future.

On the occasion of the Y.C.S. excursion to Fairburn Ings, members met at Ferrybridge, followed the canal to Brotherton, on to the Marshes and forward to our objective. In all twelve land and six freshwater mollusca were taken. The shells of the latter seemed much stronger than they were six or seven years ago when the last excursion was made.

Mr. B. Bussey, the President of the Y.C.S., was the leader on September 7th, when the Y.C.S. went to Walton Hall. The dominant feature was the *Anadonta cygnaea* L. These were very numerous.

The smallness in growth of *L. pereger* Müll. seems to have been noted by all workers in the field, nearly all give as their opinion the hot, dry summer for retarding them.

ENTOMOLOGICAL SECTION

Coleoptera (Dr. W. J. Fordham) :—Very little has been done with the coleoptera in the county during the last year. A full report will be published in *The Naturalist*. Two species new to the county have been taken, *Liparus coronatus* on Strensall Common by Mr. A. Smith, and *Gymnetron melanarius* at Pickering by Mr. M. O. Barnes.

Diptera (Chris. A. Cheetham) :—The season has not been very good for diptera, the only time I found the troublesome wood species *Hydrotaea irritans* too plentiful was on the Redmire excursion, possibly there were too many of the biting species at Skipwith but in neither case was the trouble as bad as one has known it to be the case.

Some interesting species were taken on our excursions, at the Huddersfield meeting I was pleased to get *Tipula truncorum* Mg. Previously I caught this at Pateley Bridge and Adel, and I had a doubtful female caught by G. T. Porritt so this confirms the Huddersfield area for the species. A pretty winged species, *Ephelia mundata* Lw. was flying in small swarms on the same occasion. I have taken this previously at Austwick and Hawnby. At Skipwith Mr. Smith took one of the gall makers *Euribia stylata* Fab., which was an addition to the Yorkshire list and I got another addition in this group at Nunnington on the Wombleton excursion, *Sphenella marginata* Fln., on this excursion we got some

other interesting species, by the river side at Nunnington *Hexatoma* (*Peronocera*) *fuscipennis* Curt. was fairly plentiful on Umbellifers, the only previous Yorkshire record is in the Victoria County History from Bolton Bridge ; it is known very little as a British insect. We visited Cauklass Bank on this excursion and I got a fine addition to our list there, a Tachinid *Echinomyia fera* L., and I also caught an Asilid, there, *Machimus atricapillus* Fln., I had this species previously at Pocklington and Smeaton Crags. At Wombleton on the old brick ponds a great many pretty Dolichopods, *Poecilobothrus nobilitatus* L. were on the water surface. I had previously swept this from low vegetation at Bubwith and Pocklington.

During a few days spent in Little Langdale I got some interesting species, two Tabanids (Horseflies), *Tabanus sudeticus* Zel., which, according to Oldroyd in the new British Blood-sucking Flies, is restricted to Scotland and the Lake district. (I have a specimen caught at Humphrey Head) and *Therioplectes micans* Mg., which Oldroyd says is one of the rarest of the genus in Britain.

On May 28th I caught a Syrphid, *Chilosia chrysocoma* Mg. on the summit of the Pike of Blisco, according to Verrall this is a very rare species, the altitude where I took the specimen is 2,300 ft. above O.D.

Hemiptera (J. M. Brown) :—Owing largely to the exigencies of the times, all my collecting during the past season has been of a local character around Robin Hood's Bay, and in anticipation of a complete list of captures the following are perhaps the most interesting species taken.

Heteroptera (J. M. Brown) :—

Acanthosoma hæmorrhoidale L. Plentiful on hawthorn as nymphs and adults, Brockets, 30/7/39 and again 18/9/39, and as nymphs at Howdale, 4/9/39.
Ischnorhynchus ericæ Horv. Howdale, 13/7/39, among *Erica*.
Salda cincta H.S. Maw Wyke, 20/5/39.
Microphysa elegantula Bær. Widely distributed and plentiful on tree trunks from August to October.
Temnostethus pusillus H.S., also widely distributed on various trees. One long-winged individual at Ramsdale, 13/9/39.
Globiceps dispar Boh. At roots of rushes on the moor above Raw, 13/8/39.
Cyrtorrhinus caricis Fall. Plentiful, along with the last.
Orthotylus prasinus Fall. Brockets, 30/7/39.
O. ericetorum Fall. Common at heather roots, Ramsdale, 20/7/39 ; Raw, 12/8/39.
Heterotoma merioptera Scop. On mint in the garden, 13/8/39.
Pantilius tunicatus F. Plentiful on alder, Brockets, 18/9/39 to 8/10/39.
Sigara moesta Fieb. In a pool of the cliffs, 7/5/39.
S. linnei Fieb. Along with the last.

Homoptera (J. M. Brown) :—

Eupelyx cuspidata Fab. Brockets, 30/7/39 ; North Cliffs, 3/8/39.
Delphacodes denticauda Boh. St. Ives, 5/6/39.
D. forcipata Boh. Rather plentiful, Howdale, 31/5/39.
Criomorphus albomarginatus Curt. Plentiful, Howdale, 30/5/39 ; St. Ives, 5/6/39 ; Ramsdale, 31/5/39.
Aphalara calthæ L. On larch, Ramsdale, 13/9/39.

Neuroptera (J. M. Brown) :—

Lacewings do not seem to have been very plentiful with me this season, and few have been taken. These include :
Hemerobius simulans Walk. Brockets, 25/6/39, and Fylinghall, 8/6/39.
H. stigma Steph. Thorny Brow, 20/6/39.
H. marginatus Steph. Brockets, 18/9/39.
H. humulinus L. Brockets, 8/8/39.
Kimminsia betulina Strom. Brockets, 18/9/39.
Chrysopa flava Scop. Brockets, 30/7/39.

Dragonflies have been rather more numerous and were plentiful about a small pool on the cliffs in June, when the following were seen : *Ischnura elegans*, *Coenagrion puella*, *C. pulchellum*, and *Pyrosoma nymphula*. *Sympetrum striolatum* occurred in Ramsdale, 2/9/39.

Psocoptera (J. M. Brown) :—An addition to the Yorkshire list of Psocids has been made by the capture of *Peripsocus parvulus* K. in numbers on sycamore trunks at Fylinghall. *Elipsocus abietis* K. previously noted from Dent, has evidently been overlooked. It occurs plentifully on larch, Ramsdale, and I have specimen which I took in Ecclesall Woods, and at Wyming Brook, Sheffield (V.C. 63).

Other species of interest include *Metylophorus nebulosus* Steph., *Psococerastis gibbosus* Sulz., *Loensia fasciata* Fabr., all from Brockets. *Hyperetes guestfalicus* K. and *Reuterella helvimacula* End. were plentiful on tree trunks at various places during September and October.

Plecoptera (J. M. Brown) :—In this district, Stoneflies like Caddisflies and Mayflies, appear to have been distinctly less plentiful than usual. No additions can be made to the county list, but the following have occurred in the district.

Perlodes mortoni Klap. Howdale, 4/5/39.
Taeniopteryx risi Mort. Brockets, 27/5/39.
Capnia nigra Pict. Brockets, 12/3/39, along with nymphs ready to emerge.
Leuctra inermis Kmpy. Howdale, 31/5/39.
Protonemura præcox Mort. Brockets, 12/3/39.
Amphinemura cinerea Oliv. Howdale, 31/5/39.
A. standfussi Ris. Robin Hood's Bay, 12/7/39.
Nemoura erratica Cl. Howdale, 4/5/39.
N. variegata Oliv. Ramsdale, 5/6/39.
Nemurella inconspicua Pict. Howdale, 31/5/39.

It should be noted that in an exceedingly useful paper by Mr. D. E. Kimmins (*Trans. Soc. Brit. Ent.*, VII, 3, 1940) it is pointed out that the species commonly referred to as *N. marginata* Pict. should now be called *N. erratica* Claassen, and that the true *marginata* does not occur in Britain.

Orthoptera (J. M. Brown) :—To the short list of Grasshoppers found in this district given in last year's report we can now add the interesting species *Chorthippus parallelus* Zett., a species with aborted wings in both sexes, and with elytra somewhat reduced in the male and very much reduced in the female. Previous Yorkshire records seem to give it only for V.C. 63.

Lepidoptera (E. Dearing) :—Many recorders have found their usual routine interrupted during the year and this report is, of necessity considerably curtailed.

The Union held meetings at Austwick, Kirkburton, Skipwith, Redmire, and Wombleton during the summer and reports have been published in *The Naturalist*. Other material submitted by members forms the substance of this report. Thanks are due to Messrs. E. G. Bayford reporting from Barnsley, M. D. Barnes for Huddersfield (Marsh), W. Greaves for Halifax, M. Longbottom for Keighley, W. E. L. Wattam for Huddersfield (Newsome), A. Smith for York and district, H. Spencer for Elland, and A. E. Winter for the Knaresborough area.

The usual immigrant butterflies have been observed. *Vanessa cardui* (L.) was seen at Elland but six larvæ and a single imagine only were observed. Two or three imagines of *Vanessa io* (L.) were noted at Elland, twelve were seen at once on Austwick Moss and two were seen at Pickering in early May. *Vanessa atalanta* (L.) was ' seen but rarely ' at Barnsley, ' not many larvæ but a considerable number of imagines '

at Elland, in ' normal numbers ' at Marsh, and ' some imagines at Newsome in August.' A peculiarly marked specimen was mentioned by W. Greaves, but full details were not given. Larvæ were found on nettles at Murton near York on August 4th.

Vanessa urticæ (L.) has occurred ' in fair numbers ' at Newsome, ' exceedingly abundant at Marsh,' swarming in Coverdale, N. Yorks. in early August, ' but rarely ' at Barnsley, ' fairly common ' at Elland, and ' common at Halifax.' *Chrysophanus phlæas* (L.) has been noted ' in fair numbers ' at Newsome, ' abundant at least three broods ' at Marsh, ' common ' at Halifax and Elland, and the ' next commonest species to *Pieris brassicæ* (L.) ' at Barnsley. At Keighley male imagines of *Euchloe cardamines* (L.) were in flight in Skipton Road on May 29th, 1940. Mr. Bayford notes as his most interesting record the find of a battered specimen of *Epinephele ianira* (L.) which he had not previously observed within the confines of the Old Borough of Barnsley. *Pieris brassicæ* (L.) has been abundant during the season. Special comments were made by Mr. Wattam, who destroyed between 5th and 12th of August about 127 egg clusters which averaged 28 to 31 eggs per cluster ; even so he notes some must have escaped attention for subsequently some 300 larvæ were destroyed. At Keighley the summer brood was particularly abundant. A ' cloud ' was reported at Carlton, three miles from Barnsley, flying south. Mr. Barnes remarks, ' three distinct broods ' —last largest—very heavy parasitisation. *Pieris napi* (L.) and *P. rapæ* (L.) were seen in fair numbers at Elland and were common at Barnsley. Mr. Smith remarks that *Nemeobius lucina* (L.) was not too common at Pickering on early May. *Argynais aglaia* (L.) and *Satyrus semele* (L.) were common at Hutton-le-Hole on August 5th. *Deilephila elpenor* (L.) was taken in the larval state at Scotton, near Knaresborough, is ' increasing in number ' near Barnsley and ' is not so common as last year ' at Huddersfield. *Acherontia atropos* (L.) was found in early August near Steeton, Keighley, by Mr. L. Barker. A single larva of *Sphinx convolvuli* (L.) was found by a postman near Scotton, Knaresborough. Only one record of *Macroglossa stellatarum* (L.), ' in a garden at Marsh, June, 1940,' is to hand this year. At Elland Mr. Spencer has seen larvæ of *Notodontia dromedarius* (L.), *Odontosia camelina* (L.), and *Drymonia dictæoides* (Esp.), while flowers of Valerian attracted many imagines of *Plusia chrysitis* (L.), *P. festucæ* (L.), *P. pulchrina* (Haw.), *P. gamma* (L.) and *Abrostola triplasia* (L.). *P. festucæ* was more common than usual. *Apocheima pedaria* (F.) was unusually common in Elland Park Wood from February 24th to 28th, and on the 24th 40 males and 24 females were taken.

Mr. Wattam mentions that Noctuid imagines have been inconspicuous. *Plusia gamma* (L.) and *P. iota* (L.) were common towards the end of August. *Graphiphora glaveosa* (Esp.) occurred as well as the common forms of Hepialidæ. *Polyploca flavicornis* (L.) and *P. pilosaria* were noted ' in fair numbers despite the Arctic winter.' Larvæ of *Acronycta rumicis* (L.) have been conspicuous while feeding on the haulms of both garden and sweet peas.

Mr. Bayford mentions that *Odesia atrata* (L.) and *Graphiphora pronuba* (L.) have occurred in ' utmost profusion.'

Further notes made by Mr. Smith were *Metrocampa dolabraria* (L.), one specimen bred, Strensall May 7th. *Eupithecia pygmeata* (Hubn.), flying near the bridge at Buttercrambe on June 9th. *Dicnorampa tanaceti* was found in the same location among tansy on the river-side. *Leptomearis immutata* (L.) was fairly plentiful at Buttercrambe. *Telphusa alburmella* was plentiful at Strensall on July 10th. At Hutton-le-Hole on August 5th, *Eucestia plagiata* (L.) and *Ennychia cingulata* were common.

The nomenclature of the insects mentioned above is that of E. Meyrick, 1927.

., 1941 No. 787

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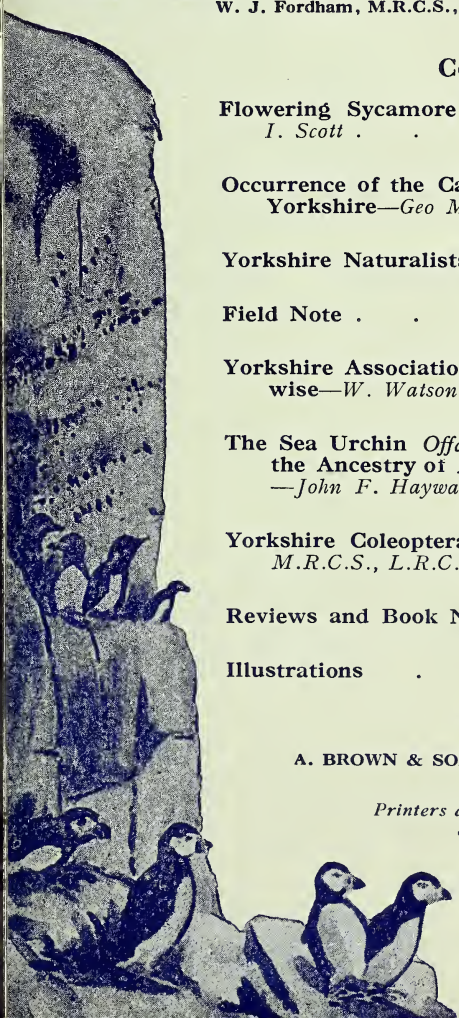

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FLOWERING SYCAMORE SHOOTS

LORNA I. SCOTT

WHILE collecting twigs of sycamore in March, 1940, to demonstrate the sympodial forking of flowering shoots, it was noticed that the remains of inflorescences are still attached in many cases and that these show considerable variation in their relation to the buds of the fork. In some cases the expected condition was seen in which the 1939 inflorescence was flanked by a pair of typical sessile buds (Fig. 1), but in many others it was found that the buds at the base of the inflorescence showed a year's growth, as indicated by the girdle scar at the base (Fig. 2). It was evident on closer

Fig. 1

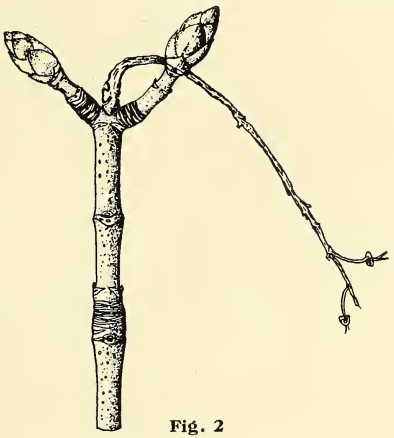

Fig. 2

examination that the axis of the inflorescence in the latter case was more dried out and shrivelled than in the typical case and there is no doubt that they have persisted *in situ* since the 1938 flowering season. This conclusion has been further confirmed by occasional specimens such as that shown in Fig. 3 in which an old dry inflorescence axis has remained attached since 1935, while the buds at the base of it have grown vegetatively for the next two years and then flowered again in 1938. The persistence of old inflorescence axes appears to be specially common on trees which have flowered freely for several years and consequently have not been making vigorous growth.

When the terminal bud of a vegetative shoot is dissected in winter, it is usual to be able to remove about seven pairs of bud scales and two or three pairs of foliage leaves ; normally the markings on the extension shoot formed the previous season shows that above the girdle scar, two or three pairs

FEB 28 1941

of leaves were expanded before there was again a transition to the bud scales of the next winter bud, so that normally all the foliar structures to be expanded the next season are already present in the winter bud of sycamore. When the terminal bud is to produce flowers, the bud contains the six or seven pairs of bud scales, two pairs of foliage leaves and the inflorescence ; after fruiting this axis dries back to the buds in the axils of the last pair of foliage leaves, when it may either be broken away or persist. Though this is the normal behaviour, in some young and very vigorous trees, though the dissection of the terminal winter bud shows the usual series of scales and only two or three pairs of foliage leaf primordia, when the shoot extends in spring its growth is evidently so vigorous that not only are the leaves in the bud expanded but in addition more leaves are formed and expanded in the same season ; in one such case a vigorous shoot had produced in three successive years five pairs, nine pairs and five pairs of foliage leaves respectively and on occasion many more than these may be found. When a vigorous shoot of

Fig. 3

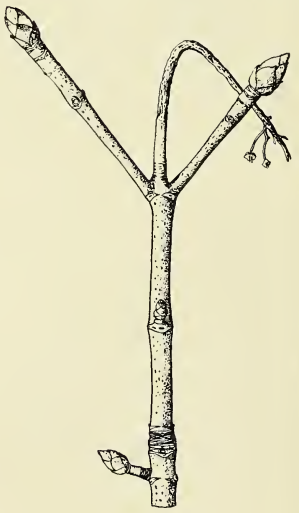

Fig. 4

this kind passes into the flowering condition, no more leaves can be formed from the same apex as this has formed the inflorescence, and if any more leaves are formed and expanded in the same season they can only be formed at the bud apices. This condition is illustrated in Fig. 4 in which the buds of the uppermost pair, always the most vigorous, have grown out in the first season and have expanded two or three pairs of foliage leaves separated by extended internodes before forming the winter bud. Such cases are easily recognised by the absence of girdle scars at the base of the branches and it is also a feature that where such immature buds have grown out, the resulting branch tapers to the base instead of being wider at the base as in the normal branches.

In the shoots which still have 1939 inflorescences in position, it was found that they still showed firm attachment and no clearly defined line of delimitation ; this was especially marked in the vigorous shoots where the drying process had not yet reached the base of the inflorescence axis (Fig. 4) and it is possible that this may in some cases be associated with the presence of relatively large bracts subtending the lower partial inflorescences. In no case is there evidence for a sharp line of abscission. When the axis dries back, the cortex shrivels and may break away (Fig. 3 top right), while the wood maintains connection and it is only when the latter is broken that the inflorescence falls and frequently leaves a short woody snag on the scar.

OCCURRENCE OF THE CAMBERWELL BEAUTY IN NORTH YORKSHIRE

GEO. MACHIN

During the last week of August, 1939, Mr. Reuben Pexton, of Sinnington, was riding his bicycle along the road on the south side of Appleton-le-Moors Common when he noticed an apparently partially disabled insect fluttering in the roadway. He dismounted and secured it. A few days later his brother Robert brought it to me. I stayed till recently in the village, placing the insect in a tin in what I beieved to be a dry place, intending to set it when I returned home. I find, however, very unfortunately, that it had sweated seriously, and nothing remains but the barest fragments. The insect was a fine specimen of the ordinary Continental type of Camberwell Beauty *Vanessa Antiopes*. I am told that Mr. Head, of Burniston, has occasionally bred the insect, but had none for emergence in 1939. Burniston, in a straight line, would be 17 to 18 miles away. I am informed the last North Riding specimen was a bird-devoured one 40 years ago.

1 Feb. 1941

INCOME & EXPENDITURE ACCOUNT
Year ending November 5, 1940.

INCOME.

		£ s. d.	£ s. d.
Members' Subscriptions,	Arrears	22 15 6	
	Current	45 2 0	
	Advance	1 5 0	
			69 2 6
Levies	Arrears	2 18 7	
	Current	6 19 7	
			9 18 2
Interest from—			
£200 4% Consols			8 0 0
£170 16s. 9d. 4½% Conversion ...			7 13 8
Booth Fund £100 3½% Conversion			3 10 0
Cheeseman Fund £100 3½% War Stock			3 10 0
Naturalist—			
Subscriptions,	Arrears	42 0 0	
	Current	85 0 0	
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			129 10 0
Donations from R. Chislett, Esq. ...			7 0 0
Discounts			3 14 7
			£241 18 11

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	£ s. d.	£ s. d.
Secretary's Stationery		1 8 6
Secretary's Cash Expenses		8 3 0
Excursion Circulars		34 1 0
Members' Cards		10 11 0
Renting of Rooms		1 4 2
Treasurer's Cash		2 0 0
Wreaths		1 18 6
Bank Charges		0 10 0
Naturalist—		
Naturalist to Members	126 17 0	
Naturalist Exchanges	5 12 6	
Binding	0 19 0	
Extra Pages ...	20 9 0	
Editor's Postages ...	10 10 0	
		164 7 6
Printing of Annual Report		2 10 0
Balance of Income over Expenditure		15 5 3
		£241 18 11

BALANCE SHEET, November 5, 1940.

LIABILITIES.

	£ s. d.
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£159 10s. 11d. 4% Consolidated Stock		159 10 11
Subscriptions unpaid ...	71 7 0	
Written off	23 7 0	
		48 0 0
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Examined and found correct,
24*th November*, 1940.
W. D. HINCKS.
JOHN R. DIBB.

FIELD NOTE

Siskins at Hebden Bridge.—Siskins—unusual visitants to the Halifax district—were seen on January 5th, 1941, feeding on alders at the Lodge gates, the main entrance to Hardcastle Craggs, Hebden Bridge. These two alders, close to the main thoroughfare, seem favourites with Siskins, as on December 26th, 1936, six were present on these identical trees and remained until January 5th following. A number of fine cocks were among a party of at least ten. Their black crowns, bright greenish plumage, prominently streaked and forked tails were noticeable features, as the Finches fed busily on alder seeds well up the trees. On ground beneath, covered with snow, cock Chaffinches and a Redpoll made bright splashes of colour on this cold winter day. The observers were H. Foster, G. R. Edwards, H. Tordoff, and the writer.—V. S. CRAPNELL.

YORKSHIRE ASSOCIATIONS, LICHENOLOGICAL OR OTHERWISE

WALTER WATSON, D.Sc., A.L.S.

[Presidential Address to the Yorkshire Naturalists' Union, delivered at Bradford, December 7th, 1940].

It is with mixed feelings that I rise to give this address. On the one hand, one wishes it could be held in better circumstances ; on the other, I deeply appreciate the honour you have conferred upon me by making me your President this year. Though most of my life has been spent in the milder and less energy-giving climate of the South-west, I spent my first twenty-five years in my native county, have often paid visits to it, and have always been proud that Yorkshire had such an active Naturalists' Union. It is true that most of my early years were spent on the borderland, where Yorkshire abuts on Lancashire, but this is compensated for, as I was born at Wetherby, almost in the centre of the county, my Yorkshire spirit was never contaminated by the borderland, and the War of the Roses on the cricket field found me displaying a white rose. If one may play upon words, it may be that, being a borderer, made me a good moss-trooper, though actually I first took up the study of mosses in Somerset. During my visits to the North such studies were continued on my native heath, and I recall one memorable September day in 1912, when, with some other botanists, Hebden Bridge was visited. We took Needham in a cab to Hardcastle Crags on one of the last expeditions he made. Needham was one of the working-men botanists whom we were more familiar with at that time than we are to-day. He had done much good work with the flowering plants and mosses, but, at the time of our visit, was more interested in fungi. What was supposed to be a new British liverwort, *Lophozia atlantica*, had been discovered at Hardcastle Crags, and we were desirous of seeing it. Needham knew where it had been found and was useful to us in pointing out the particular spot, but could not find the plant. Eventually it was located, a few scraps were taken for specimens, and we descended the slope of the hill. One of our party turned back to verify the particular characters of the slope where the plant occurred. As he was well-known to be rather too keen on collecting for distributing purposes, we all went back with him. As some of my later remarks will refer to ' small species ' I may say that I was not satisfied with the status of *Lophozia atlantica*. After microscopic examination and comparison with dry-ground forms of *L. Floerkii*, I considered that its claim to specific rank was a slight one. In *The New Phytologist* of June, 1913, I ventured

to state my views in the following words : ' *L. Floerkii* . . . and *L. atlantica,* though quite distinct in their extreme forms, have many intermediates which are difficult to refer to either. . . . The abundance of moisture causes *atlantica* to approach *Floerkii* ; on the other hand, the drier ground form of *Floerkii* has a very similar facies to that of *atlantica.*' Since then *L. atlantica* has been found in many parts of Great Britain and, during the last few years, the view that *atlantica* is merely a form of *L. Floerkii* has been generally accepted by British hepaticologists. As some of the records during the intervening years were due to me I may have laid myself open to a charge of inconsistency, but in regard to such records I usually subordinate my personal views to those generally accepted.

I believe it was W. Ingham, of York, who had first found the plant. For some years he was the secretary of the Moss Exchange Club and was helpful to its members. During my early struggles with bryophytes he helped me very much by confirming or rejecting my views as to their determination. My introduction to *The Naturalist* was through him when, in 1909, he mentioned that I had found the moss, *Funaria Templetoni*, at Greenfield in Vice-county 63. My first personal acquaintance with him was at his home in York in September, 1909, but it was nearly five years later when we had our first—and last—field-day together. We met at Riccall in April, 1914, and spent the day on Skipwith Common, where he introduced me to *Campylopus brevipilus* and *Hypnum sendtneri*. He was enthusiastic in his bryological pursuits and, despite his School Attendance Officer manner, was a kind and pleasant companion in a moss-trooping expedition. In regard to lichens I was rather disappointed in the Common. Cladonias were fairly plentiful on the ground, but arboreal lichens were few and compared very unfavourably with those of Somerset. I may also say, *en passant*, that as my initial studies of bryophytes had been made in the rural districts of Somerset, it was almost necessary to relearn how to recognise them in the field, when they were studied in or near the industrial districts of Yorkshire. Dr. Frank Cavers and our present secretary were expected to join in the Skipwith expedition, but for some reason or other were unable to do so, and it was some years later before I had the pleasure of meeting the latter. Dr. Cavers, however, was well known to me through our meetings in connection with the Ecological Society in London and elsewhere, but I never met him on our native heath. He was a wonderful man in his ability for reading about some group of organisms, digesting a large amount of information and writing an able article on them. He was a most intelligent and enjoyable companion, but did not do much field work. On the few occasions when I have been

with him in the field he was less familiar with the hepatics than when writing about them.

If these wanderings remind you of the Sentimental Journey of Lawrence Sterne, you must remember that the title of my address is rather vague, and intentionally so. There is a story told of Sammy Hicks, one of the Yorkshire evangelistic local preachers of the later part of the nineteenth century. During a prayer meeting one of the congregation started a long metre hymn to a short metre tune, and some difficulty was experienced in fitting the words to the music. Sammy was aware of the difficulty and encouraged the congregation by shouting out for them ' to pucker it in.' This is what I am going to do in this address.

About forty years ago Dr. C. E. Moss, a Yorkshireman who obtained his degree at Leeds University, did some excellent work on the distribution of vegetation in Somerset. During a conversation with him, I mentioned that similar work on the bryophytes and lichens found in the woodlands of Somerset was possible, and he encouraged me to produce an ecological account of these woodlands in regard to bryophytes. This was published in *The New Phytologist* of March, 1909, and was the first definite ecological paper, in which the differential distribution of these lower plants was taken into account, published in this country.

As some of you are aware much of my work since that time has been ecological study in regard to bryophytes and lichens. This has brought me into contact with many ecologists who desired the bryophytes and lichens of some area they were investigating to be identified. There were many bryologists who were able to assist in such work, and for some years I have given more help with the lichens. This naturally led me to a study of the distribution of lichens in our country and, as this is a Yorkshire Naturalists' meeting, I thought that some account of those who have helped in the knowledge of their distribution in Yorkshire would be appropriate.

The earliest reference I have found to a Yorkshire botanist who collected lichens is to Richard Richardson, who was born in 1662 and died in 1741 at North Bierley, which is included in Bradford at the present time. He was a medical man, was chiefly interested in the flowering plants in which his name is commemorated in the genera of Richardia and Richardsonia. He contributed to many journals, and in the *York Philosophical Transactions* gave an account of his discovery of the rare Killarney fern, *Trichomanes radicans*, which most of us have seen merely as dried specimens or preserved in some of the Killarney hotels. Probably his acquaintance with lichens, which were considered even in Linnæus' time as the ' poor trash of vegetation,' was merely incidental, but his name is

given as the earliest collector of some lichens in vice-county 64, Mid-west Yorkshire, which lies to the north of this town on the other side of the Leeds and Liverpool Canal.

In the later times of the eighteenth century and the early portions of the nineteenth several botanists have Yorkshire records of lichens credited to them. Sir James Edward Smith, the founder of the Linnean Society, has little claim to be considered as a Yorkshire botanist as he was born at Norwich in 1759 and died at the same place in 1828. He, however, collected lichens and is credited with some original records from V.C. 64. Samuel Hailstone also contributed some lichens for V.C. 64. Although he was born at Hoxton he has a better claim than Sir Edward Smith to be considered a Yorkshire botanist as he practised as a solicitor in this town, contributed to Yorkshire publications and on his death in this town in 1851 left his herbarium to York Museum. James Dalton, who was the Rector of Croft, and died there in 1843, also did some work with the lichens, some records for V.C. 64 being credited to him. He was, however, more interested in sedges and mosses and our bryologists who have been to Killarney may have collected *Daltonia splachnoides*, the generic name of which is given in memory of his work. William Brunton, who died at Ripon in the early part of the nineteenth century (1806), collected some lichens in Vice-Counties 64 and 65, Mid-West and North-West Yorkshire. He was well known as a bryologist, the moss *Cynodontium Bruntoni* being named after him.

The records and recorders of lichens become more numerous in the nineteenth century when their peculiar nature began to be recognised and their status raised above the ' poor trash of vegetation ' as Linnæus considered them. This was largely due to the work of the continental lichenologists, Acharius, Fries, and Nylander. In this county their foremost investigator was William Mudd, who was born at Bedale in 1830 and was a gardener at Great Ayton, Cleveland. He collected many lichens in the North Riding, and most of the lichen records for V.C. 62 are credited to him. His *Manual of British Lichens*, which was published in 1861, was the first real systematic British account of lichens and of greater value than Lauder Lindsay's *Popular History of Lichens* which was published five years earlier. He came to the conclusion that ' of all organs furnished by a given group of plants, none offer so many real, constant, and physiological characters as the spores of lichens for the formation of a simple and natural classification.' Before his time the reproductive bodies had mostly been regarded as of secondary importance and the basis of classification schemes followed largely on the character of the thallus. His recognition of the importance of the spore

in a simple and natural classification did not involve the neglect of other characters. The shape, size, colour, and septation are all considered at the present day as important for classification purposes. The size of the mature spore may be very useful in the determination of a lichen, but in impoverished plants the spores are often ill-developed. In such a case the relation of the length of the spore to its breadth is more useful. Mudd, in his *Manual*, used many of the generic names of to-day, the later classification adopted by Leighton and Crombie being retrogressive. The most curious thing about his *Manual* is in his use of the fractional parts of an inch for the size of the spore. In many cases the spore sizes were wrongly given, either his measurements or his mathematics were misleading. He also published an account of the British Cladoniæ in 1865. He was an assiduous collector, prepared three fasciculi of 100 specimens each, and in many other ways helped considerably in the advance of lichenological knowledge in this country. During the later years of his life he became the curator of the Botanical Garden at Cambridge, at which town he died in 1879. I have seen some Cleveland specimens of Mudd's time marked A.T.M. and presume that they were gathered by a member of his family.

Dr. John Windsor, who was born at Settle, did a lot of work in his particular district. His *Flora Cravoniensis*, which was published in 1873, five years after his death, refers to a number of lichens found in the Craven district. Abraham Stansfield, who was a nurseryman at Todmorden, where he died in 1880, is better known as a collector of British Ferns, but is credited with some lichen records for South-West Yorkshire, V.C. 63.

Amos Carr, who was born in Kent, can be considered a Yorkshire botanist as he was a postman and bootmaker at Sheffield during the middle of the nineteenth century, was familiar with the plants found in his district, for which some lichen records are credited to him. His name carries us on to the better-known bryologist and lichenologist, Dr. Benjamin Carrington. He was born at Lincoln, but much of his work was done during the time he practised medicine near Leeds. After William Mudd, he is probably the most prominent figure in the lichenological history of Yorkshire and without exception in its hepaticological history. He (with L. C. Miall) published the *Flora of the West Riding* in 1862, and his great work on *British Hepaticæ* was published in 1874-75. He is responsible for many records of bryophytes and lichens in the three vice-counties of West Yorkshire and his name is commemorated in the hepatic *Radula Carringtonii*. Recently I have examined some lichens collected by him in the Clapham district in 1857. Apparently they had been sent to Lindsay for identification but they were still unnamed when they were

sent to me last year. Lindsay apparently paid a visit with Carrington to the Clapham district in 1859 and some of the crustaceous lichens collected then were also awaiting identification. They were mostly lichens which were known to occur in the district, but about ten of them had not been recorded for V.C. 64 till they were determined by me. Carrington, who died at Brighton in 1893, bequeathed his collection of hepatics to Manchester.

The name of Aveling, who wrote an account of Roche Abbey in 1870, is given in Lees' *Flora of West Yorkshire* as the recorder of lichens from that district, but those records are really due to John Bohler, whose *Lichenographia Brittanica* was published in 1853-7 and who wrote the flora of Roche Abbey in Aveling's book. He was a Derbyshire man, worked at lichens in the adjoining counties, and died at Sheffield in 1872. Robert Teesdale, the Yorkshire botanist, after whom the cruciferous genus Teesdalia is named, Dr. Deighton of Clapham, J. G. Baker of Thirsk, and W. T. Bull are credited with some lichen records from Vice-counties 64 and 65.

Coming nearer to our own times we find the name of William West, the algologist of this town, figuring prominently in regard to the ecology and distribution of lichens. I visited him in 1909 and found him busy arranging his collections. A pleasant chat with him left me impressed with his wide range in botanical knowledge, especially with algæ. He was always willing to help me when some alga required elucidating in the course of my ecological work. He contributed to our knowledge of the distribution of lichens in all the three Vice-counties of West Yorkshire, and also some notes on Scottish lichens for our *Naturalist*, and on Shetland lichens in the *Journal of Botany*. His predecessor as Botanical Secretary for this Union was Dr. H. Franklin Parsons, who was a Somerset man by birth, and practised medicine near Frome. For some time he was the Medical Officer for Goole, and added a few lichens for V.C. 63.

Thomas Hebden first came to my notice in 1913 when he was the distributor for the Lichen Exchange Club. For many years we corresponded and sent our puzzles to one another. Many packets have been returned to me enriched with little sketches showing the microscopic structure of some portion of the thallus or apothecium. In 1919 I spent several days with him in Wharfedale. Despite his lameness, from which he then suffered, he was able to revisit localities where some of his earlier finds had been made, and we had a most enjoyable and profitable time together. For 44 years he worked in various capacities for a firm of loom-makers at Keighley, and in 1892 published some new lichens under the joint names of Hebden and Shackleton in *The Naturalist*. Some of his lichens

went to the British Museum, but most of them to the Keighley Museum. Our correspondence continued to the end of his days (he died in 1931), and much of our joint work has been referred to by me in his obituary and in my Lichenological Notes (*J. of Bot.*, 1931 and 1917-1931).

In 1925 the well-known Harlech botanist, D. A. Jones, attended a meeting of this Union at Ingleton, and paid particular attention to the lichens of the district. An account of these appeared in the August *Naturalist* of the same year. This was referred to by me in the October *Naturalist* of 1935, when I gave a supplementary list. We may also reckon Albert Wilson as a Yorkshire lichenologist, though most of his lichenological work has been done outside our county and, at the present time, has been superseded by his attention to other botanical matters, whilst his residence in North Wales has prevented work in this county. I have botanised with him in Wales, Scotland and Lancashire, but never in Yorkshire. At the present time we have Mr. Wattam carrying on the good work when his researches on the Juniper allow him to do so. Very few lichens collected in Yorkshire during recent times by recent collectors have been sent to me for identification, but I have had a few from V.C. 62 and also from V.C.64.

Considerable care has to be taken in regard to many of the records of lichens to which I have referred. As in other subjects changes in nomenclature have occurred, and some of the species recorded are now regarded as aggregates. I have previously mentioned the importance of the spore in the taxonomy of lichens, but many of the lichens had names given to them before this importance was recognised, so that an old name often originally stood for a group of individuals with a superficial resemblance to one another. Many instances are known where the author of a name included in his collections specimens under that name which are now considered from their internal characters to have no right to be so included. It is often difficult to know what plant has the most right to retain the name. It would probably have been much better if the starting-point for the nomenclature of lichens had been relegated to a later period than that of Limnaeus, to a time when the importance of internal characters were recognised. Besides this cause of confusion much splitting has been done and many changes have been made, and are still being made, in the names applied to lichens. Biology is not one of the exact sciences. It concerns life with the mobile substance we call protoplasm, so mobile indeed that it is difficult to make a definite biological statement without reservations. What is meat for one organism may be poison for another. It is necessary to keep in mind Darwin's work on the variability of organisms and on the origin of species. My personal concept

of species is nearer to that of Darwin than to the general concept of to-day, which is difficult to express by a pen and ink definition. The only definition that I can give according to its general use to-day is a very loose one. It is a term used to denote a small and convenient group in which a number of individuals sufficiently resembling one another can be placed, while a genus is merely a convenient group in which species sufficiently resembling one another can be placed. These terms are variable according to the person employing them. We think that we know our plants in the field, but, in the laboratory, they are dissected and infinite variation in their structure is found. Different interpretations and values are put on some of their characters by different investigators, and a plant, which is given one name by one determiner, may be given another by a systematist who adopts a different character as the most important one in its discrimination. Such difficulties are not peculiar to lichens but are found in all groups of organisms, especially when the systematist neglects to apply his knowledge of the variability of organisms. The name given to a plant may even depend upon the mood of the determiner in regard to the salient point on which the determination is based. The varying of the relative importance of their characters in determination of a variable plant at varying times of a varying determiner may cause one and the same determiner to give different names to the same individual plant or parts of the same individual. There is a story told of a Yorkshire botanist who collected three examples from the same plant at different times and sent them for identification to the best British authority on that particular group of plants. He could not complain of the generous nature of the response as he got three different names. Another story I can vouch for, as I was one of the victims. A bryologist collected a curious form of the common moss *Ceratodon purpureus* from the top of Snowdon. He sent it to eight different muscologists, asked them to identify it, and got three or four different names. This result was not an unexpected one, as the moss is a variable one. The Snowdon plant was certainly a peculiar form and its position had not been definitely ascertained until it had been the subject of careful study in the field as well as under the microscope. The lower forms of life are more plastic than the higher and more specialised organisms. Generally speaking, they have greater power of vegetative reproduction and regeneration and are better able to withstand changes of temperature or other conditions. As the names given to them are founded on minute differences it is not surprising that many differences of opinion are revealed by their study in the works of different systematists. As an illustration of these differences in regard

to the names of lichens, I have prepared the chart showing the specific names given to members of the *Lecidea lapicida* group (see p. 38).

As in other plants the internal and reproductive characters are much more likely to be constant and of greater taxonomic importance than external and vegetative characters. The amount of the thallus is often very variable in lichens, and, in some lichens, alpine and arctic forms with little or no thallus are often met with. In these cases determination has to depend upon the characters of the reproductive organs. When a thallus is present the coloration given by a chemical reagent is often a valuable aid in its determination. Some lichens have an amyloid substance present in the medullary tissues and this gives a blue coloration with iodine. This amyloid substance is probably of nutritive value to the lichen. As it is fairly constant, it is, taken in conjunction with other characters, very useful for identification purposes. There is, however, under some conditions, some possibility that the lichen has not been able to store the substance in sufficient quantity, and then the coloration may be absent or weakened. Potassium hydroxide solution is another valuable aid in identifying lichens, some lichens constantly giving a red or yellow coloration with this reagent. Calcium hypochlorite solution, nitric acid, paraphenylenediamine, and other reagents are also useful indicators. For example, last week I had a Cladonia sent to me for identification, and, as the sender was a phanerogamic botanist, he had pressed it before sending. It appeared to be sterile and I was inclined to regard it as indeterminable. However, on testing with some potash and chloride of lime I got colorations which indicated a particular species in which the reproductive bodies are borne on the margins of a short-stalked cup. As it was quite possible that such bodies had been overlooked I re-examined it with a lens and found two small cups agreeable for the species indicated by the chemicals, though the squamules of the thallus were rather small and their ascending character obliterated by pressing. Most of these substances which give the colorations with the reagents are probably due to incomplete metabolism, their quantity and quality may vary, and though useful as indicators it is unwise to attribute too much importance to them.

In the chart the primary division of the group is based on the colour of the hypothecium, and this is a good method for most Lecideas. In the *lapicida* group there are so many gradations between a colourless and a dark-brown hypothecium that the value of this character becomes lessened. The reaction with caustic potash is not quite so definite as the chart indicates. Probably no lichenologist of the present day accepts all these names. Nine of the specific names shown are definitely

GROUP OF *LECIDEA LAPICIDA*

General characters : Thallus usually flattish, whitish or greyish, on dark hypothallus, C−, medulla bluish with iodine ; apothecia about 1 mm. diameter, at first innate, plane and marginate, later becoming more or less emergent and convex and sometimes immarginate, with dark wall ; paraphyses usually septate, coherent but often loosely so, often somewhat thickened at apices which are dark-bluish or -greenish or sometimes -brown, with nitric acid more or less rose-violet, with potassium hydroxide negative or little change ; asci clavate ; hymenium about 60 micromillimetres, with iodine blue then sordid ; spores ellipsoid-oblong, obtuse at both ends, 8-15 × 4-7μ.

- Hypothecium pale.
  - K yellow then red. *L. pantherina* Th. Fr. (=*L. cyanea* Vain., *L. polycarpa* Fr., *L. alboflava* Krb.)
    - Paraphyses with dark-brown apices. *L. subkochiana* Cromb.
    - Other slight modifications of doubtful value. *L. polycarpoides* Nyl. Thallus ± ochraceous. (=*L. pericarpoides* Nyl.). *L. subgrisella* Nyl. Apothecia bluish-grey, etc.
  - K− *L. lapicida* Ach. (=*L. polycarpa* Flk.)
    - Paraphyses not septate. *L. subterluescens* Arn.
    - Apothecia pruinose. *L. tesselata* Flk. (=*L. cyanea* Th. Fr.) (=*L. spilota* Fr.)
      - Thallus bluish-green. Apothecia with pruina soon disappearing. *L. cæsia* Ach. (=L. *injuncta* Nyl.)
- Hypothecium dark.
  - K− *L. declinans* Nyl.
    - Paraphyses not septate. *L. declinascens* Nyl.
  - K yellow then red.
    - Thallus verrucose, ferrugineous. *L. silacea* Ach. (=*L. subsilacea* Nyl.)
    - Thallus verrucose.
      - Thallus sulphur-yellow. *L. theiodes* Somm.
        - Th. grey. Apoth. ± white-pruinose. *L. swartzioides* Nyl. (=*L. peralbida* Th. Fr.)
      - Apoth. ± bluish-pruinose. *L. sublactea* Kern.
        - Other slight modifications of doubtful value. Areolæ convex *L. sympecta* Nyl. Th. darker, etc., *L. sudetica* Krb.
    - *L. lactea* Flk. (=*L. vogesica* Schaer.).

given as synonyms, though not always for the same segregate, *e.g. L. cyanea* is given for *L. tesselata* by Th. Fries and for *L. pantherina* by Vainio. Six of the species (*lapicida, subkochiana, declinascens, tesselata, silacea, lactea*) are given in A. L. Smith's *Monograph of British Lichens*, but even some of these have been placed as varieties or forms by other lichenologists. The edges of the chart may be curved round so that *L. lactea* is near to *L. pantherina* and considered as a variety or form of it with a darker colour for the inconstant hypothecium. In a similar way *declinans* may be placed as a form of *L. lapicida* though there is some inconstancy in the use of this name. The verrucose ferrugineous thallus of *L. silacea* is considered by most lichenologists of sufficient importance for its retention of specific status. Its synonym *subsilacea* was due to a mistake. Nylander gave it to a plant like *silacea* except that its medullary hyphæ were coloured blue by iodine. Afterwards he found that the original specimen of *L. silacea* gave the same coloration. The two names are still retained in the lichen part of the *Cryptogamic Flora of Germany* published in 1931. *Theiodes* in the same work is given as a species and also as a variety of *L. pantherina*. *L. tesselata* differs from *L. lapicida* only in the apothecia being somewhat pruinose. *L. declinascens* has paraphyses which are without septa, and, on this account, was separated from *declinans*. This segregation has been followed by several authors. For the same reason *subterluescens* was separated from *L. lapicida*, but only one author (Arnold), so far as I know, has given it specific status. Some of the other species are reduced to varieties, forms, or modifications by some lichenologists.

One of the great difficulties that the ecologist has to contend with is the tendency to assume preciseness both in regard to the species found in various associations and in the nomenclature of such species. At the present time I have developed a more latitudinarian spirit. A detailed analysis of a particular association in one locality seldom corresponds exactly with that in another locality, and I am inclined to attribute much greater importance to incidence and the replaceability of ecological factors. A pigeon-holing botanist has as much right to use his terms or names in his way as another botanist with broader concepts, but there should be more tolerance in such matters. Many articles in our journals contain one-sided criticisms of the work of previous writers. A spirit of certainty that their methods are right and those of some earlier botanist wrong is too manifest. Such a spirit of intolerance and dogmatism is incompatible with a study of nature in all her variable moods. History does not teach that intolerance and dogmatism are associated with any virtues. It is desirable to remember with due humility that in Nature's infinite book of

secrecy 'tis but a *little* I can read, and the apt advice of Marie Ewen to a student of sea-weeds when she wrote :

' Nature hath tones of magic deep, and colours iris bright,
And murmurs full of earnest truth, and visions of delight ;
'Tis said " The heart that trusts her was never yet beguiled,"
But meek and lowly thou must be and docile as a child.
Then study her with reverence high, and she will give the key,
So shalt thou learn to comprehend the " secrets of the sea." '

REVIEWS AND BOOK NOTICES

Insect Pests in Stored Products, by **H. Hayhurst.** Photographs by H. Britten, pp. x+83, with 48 plates containing 130 figures. Chapman & Hall, Ltd., 15s. At the present time especially, it is of the greatest importance that wastage in foodstuffs and other materials stored in warehouses and elsewhere should be avoided, and while it is impossible to estimate the amount of damage caused by insects, it must be very heavy indeed. As the author of this volume states, the problem does not appear to have received sufficient attention in the past, possibly because there is a mistaken belief that infestation cannot be avoided. The object of the book is to assist in tackling the problem by indicating the most likely pests causing the trouble and giving hints for their eradication. It has been drawn up mainly from observations made in railway warehouses, but the information supplied will be useful in other connections as well. The main body of the work consists of short accounts of the insects (with several allied creatures) which have actually been found in or about the various materials in storage. Descriptions are very brief, and mainly concern colour and size, and are followed by notes on the life-history or immature stages, and a very full list of the products on which each species has been found ; for example, *Ptinus tectus* was found on 116 products and *Tyroglyphus farinæ* on 147. The actual recognition of the pests will depend on the 130 excellent photographs of adults and larvæ contained on 48 plates, but it is well-known to all entomologists how very difficult it is to make specific identifications of insects from photographs, however good they may be. Quite rightly no valuable space is wasted in an attempt to give a full account of the structure and classification of insects, one page alone sufficing. The pests themselves are listed under the headings of orders and families. As might be expected beetles occupy the most prominent position, 71 species being mentioned. It is perhaps surprising that only two species of Diptera occur. It is noted that not all the ' pests ' recorded actually feed on the stored materials. Pages 55-79 give a very useful classified list of stored products, etc., with the insects which have actually been observed on each ; wheat flour, for example, being credited with 31, and the walls, etc., of the warehouses with 49. Control measures are discussed on pp. 49-54, and as would be expected, methods of cleanliness and hygiene in storage are suggested as most effective. A good index concludes the work. A few slips in the spelling of names have escaped correction ; two photographs of *Chernes panzeri* are shown on plate 48, but we have found no reference to this species either in the text or the index ; and is it quite correct to state that the life-cycle of *Chelifer cancroides* is similar to that of mites—egg, larva, and nymph, which in all stages are replicas of the adults except as regards size ? The book is well printed and bound, and in the hands of the right person should serve its purpose, the price, however, seems rather high.—J.M.B.

THE SEA URCHIN *OFFASTER SPHÆRICUS* Schlüter AND THE ANCESTRY OF *ECHINOCORYS SCUTATA*

JOHN F. HAYWARD, M.Sc.

In 1888, Jukes-Browne described a new species of *Holaster*, to which he gave the name *Holaster rotundus*. It was confined, in this country, to the counties of York and Lincoln, and was adopted by him as the zone fossil, in those counties, of the Chalk zone elsewhere typified by *Holaster subglobosus*. In 1903 he recognised that it was identical with a species previously described by Schlüter as *Offaster sphæricus* [1869]. Jukes-Browne suggested that this was a link between *Holaster* and *Echinocorys*, and pointed out that in a previous Geological Survey Memoir [Jukes-Browne, 1887] it had been wrongly recorded as *Echinocorys*. A. G. Brighton [1928] followed him in assuming it to be the ancestor of *Echinocorys*. Lambert [1903a] had been of the same opinion, and had even gone so far as to regard it as a species of *Echinocorys*.

In shape this urchin is globular, the length and breadth being approximately equal. The height is somewhat less than the other two dimensions. It possesses a feebly developed sulcus, but this is barely visible from above. The anus is about one quarter of the distance up the side of the test. Jukes-Browne did not state the shape of the pores, but according to Schlüter they are round (*Poren rund*). Whether this '*rund*' signifies circular, or merely rounded, I do not know, and to clear up this point I have examined about two dozen specimens from both the British Museum and Geological Survey Collections. From the latter were the three Jukes-Browne syntypes which are in a perfect state of preservation. In some cases the pores are almost circular but there is usually some suggestion of elongation. This feature is very marked in specimen British Museum E 18674, and is also quite well shewn in E 20199. Of the Jukes-Browne specimens, the pores of number 12348 are very clear, and in most cases either one or both of a pair are more or less elongate, sometimes quite definitely so.

I do not hold the opinion that *Offaster sphæricus* was ancestral to *Echinocorys*, and moreover, in the course of statistical investigations now in progress [Hayward 1940] I have come to the conclusion that the ancestor was not indigenous to Great Britain. My reasons for not accepting *Offaster sphæricus* are as follows :

(1) The absence of British passage forms between the two.

(2) *Holasters* agree with most specimens of *Echinocorys* in usually having the formula Length > Breadth > Height, whereas the formula for *O. sphæricus* is, roughly speaking, Length = Breadth > Height.

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(3) Except that, as stated above, poorly preserved specimens of *O. sphæricus* have been mistaken for *Echinocorys*, there is nothing which particularly marks it as a possible ancestor. Excessive tumidity is hardly a feature typical of the earlier forms of *Echinocorys*, and in any case, there are other species which could have an equal claim in this respect.

(4) The apparent obsolescence of the sulcus is, in my opinion, merely due to the tumidity of the urchin. The sulcus is masked, but is quite definite.

The absence of *Echinocorys* in the lower part of our Turonian, its rarity in the upper part, and its greater abundance in the Senonian, can to my mind signify only one thing. The first appearance of the urchin in this country represented the earliest immigrations from another district.

The Chalk of this country represents what was in Cretaceous times the more or less shallow water bordering the northern Tethys shore. Any migrations would be approximately parallel to this shore, and would therefore be roughly in an east-westerly or west-easterly direction. Smiser [1935] suggested that the Belgian area was populated from England, and this idea stipulates migration from the west. So far as the evidence which I have seen goes, the specimens of *Echinocorys* which have been obtained from the zone of *Terebratulina lata* are almost exclusively from the most westerly outcrops of the Chalk. Except for some ' undoubted fragments ' recorded by Rowe [1900] I have had no evidence of specimens in this zone from the Weald area. This may, of course, be due to lack of material.

If such migration was the case we have to look to America for the ancestors of *Echinocorys scutata*, and, fortunately, there are one or two species which may very well occupy that position. In dealing with them, I have based my remarks upon published literature, and have not been able to examine the type specimens.

Before turning to the American species, however, it is necessary to discuss one or two other forms which have been put forward as ancestors to *Echinocorys*.

The genus *Holaster*.

The close connection between *Echinocorys* and *Holaster* has long been recognised. Forbes, in 1852, regarded the latter as a sub-genus of the former (which was then known by the name of *Ananchytes*). The species '*Ananchytes* (*Holaster*) *pilula*,' now referred to the genus *Offaster*, was regarded by him as a link between the two.

In changing from a typical *Holaster* to an *Echinocorys*, the urchin is supposed to have undergone certain changes :

(1) *Holaster* is cordiform, whereas *Echinocorys* is ovate when viewed from above.

(2) The anteal sulcus present in *Holaster* is quite absent in *Echinocorys*.

(3) The height in *Echinocorys* tends to be greater in relation to the other dimensions than it does in *Holaster*.

(4) The anus in *Holaster* is some distance up the side, whereas in *Echinocorys* it is marginal or basal.

(5) The pores in *Holaster* are elongated, while in *Echinocorys* they are reputed to be round.

An urchin possessing all five features of one or other genus can be recognised with some ease, but one with intermediate characters is somewhat more difficult to classify. There are, in fact, certain definite qualifications which must be made to the suggestions set forth above :

(1) Some types which are placed in the genus *Echinocorys* are definitely sub-cordiform in shape. Such are *Oölaster mattseensis* Laube [1869], which Lambert [1903a] regarded as an *Echinocorys*, *Echinocorys ovalis* (Clark) [1893], and possibly *E. depressa* Eichwald [1868]. Judging from the published figures, the three are closely related.

(2) Many specimens of *Echinocorys* are considerably more depressed than some *Holasters*.

(3) The position of the anus in *Echinocorys* varies. In two specimens from the *Micraster cortestudinarium* zone which will be figured by the present author, the anus is clearly supra-basal [Hayward, *b*].

(4) The statement that *Echinocorys* has round pores is not correct. The mistake is found in Wright's Monograph [1882] on page 332 (' The poriferous zones are formed of round holes placed obliquely in pairs ') and in other works. The pores often approximate to a true circular shape, but very frequently they are at least a little elongate, particularly in specimens from the lower zones. Smiser [1935] has commented on this fact. Even in the higher zones, elongate pores are found.

It is fairly evident that there is no hard and fast dividing line between the two genera, and it will be seen that a number of forms tend to be intermediate. The question arises whether they should be placed in one or other of the extreme genera, or whether one or more new genera should be erected to receive them.

Pseudananchys algira (Coquand).

Lambert [1903a] agreed with Jukes-Browne and others in believing *Offaster sphæricus* to be ancestral to *Echinocorys scutata*, and he even placed it within the genus *Echinocorys*. He retained as a separate genus another reputed ancestor, *Pseudananchys* Pomel [1883], which is much more obviously

related to *Echinocorys* as far as general shape goes, but which differs only in the arrangement of the elongated pores. This genus, based upon *'Ananchytes ' algira* Coquand [1862] comes from Algeria, and is Lower Cenomanian in age.

If Lambert is right, and *Pseudananchys* is ancestral to *Echinocorys*, I am unable to see how *Offaster sphæricus* can be a link between the two. *Pseudananchys*, of the Lower Cenomanian, is already almost an *Echinocorys*, whereas *Offaster sphæricus* is very little removed from an *Holaster*. That the three are in a direct line of descent may be possible on stratigraphical grounds, but it is totally impossible morphologically.[1]

When viewed from above, *Pseudananchys* is ovate in shape, and the anterior end is definitely flatter than the posterior. This flatness is the only relic of the ancestral sulcus, and, otherwise, the species differs very little in shape from the typical *Echinocorys*. In fact, so alike are the two, that apart from the condition of the pores they can hardly be distinguished.

It is clear that *Pseudananchys algira* is very closely related to *Echinocorys scutata*, and I believe that it was an offshoot from the primitive stock from which the British *Echinocorys* were derived. It may be that it appeared in Africa as a member of an early migration, following roughly the direction of the southern shore of Tethys. We do not know whether this migration gave rise to typical *Echinocorys scutata*, just as a later migration along the northern waters of the same ocean may have peopled the British area with the same types.

American Species.

Holaster completus.

Holaster completus Cragin 1893.
Craginaster completus Lambert 1903b.
Holaster simplex Clark and Twitchell 1915 *non* Shumard 1853.
Pseudananchis completa Lambert 1927.
Pseudananchys completus Adkins 1928.

The species *Holaster completus* Cragin comes from the Denison Beds (Lower Cenomanian) of the Comanche Series of Texas. It is rather small, and sub-cylindrical, and has a broadly oval base. The sulcus is feeble, and is found only on the lower surface of the test. The pores of each inner row

[1] It is worth remarking that in one paper [1862] Coquand described *P. algira* as coming from ' *L'étage campanien*,' and in another [1880] as belonging to the ' *assises rothomagiennes*,' and it is clear that one or other of these is incorrect. This fact was later pointed out by Gauthier [1876], who confirmed the Cenomanian age of the species.

are dot-like, or but slightly elongated, and the outer ones more elongated. The anus is on the side, like that of a true *Holaster*.

Clearly it has all the attributes of a passage form between the two genera, for not only is the sulcus obsolescent, but there is a tendency for roundness of pores. In shape it is

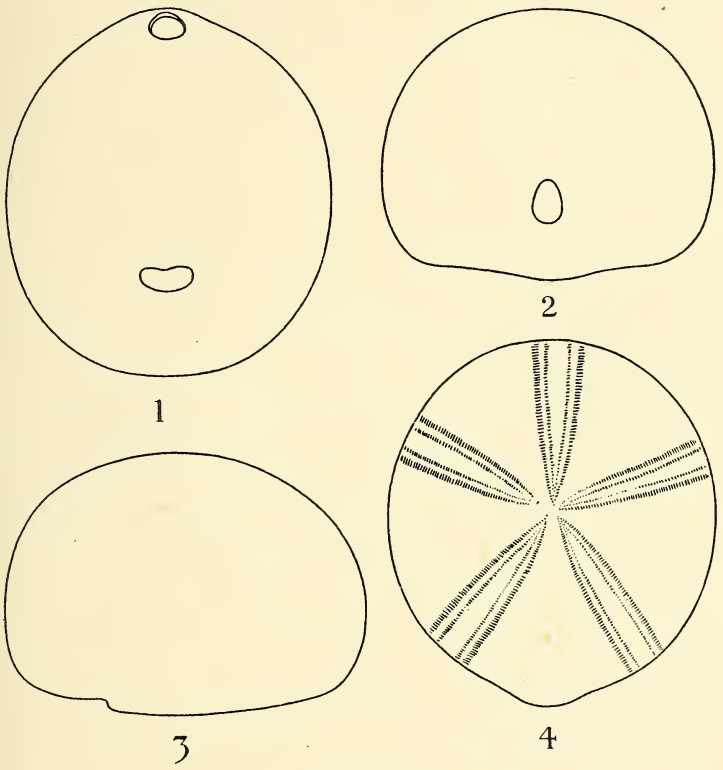

Figure I.
Holaster completus **Cragin, 1893, copied from the original figures.** (Natural size). **More detailed illustrations can be seen in Clark and Twitchell, 1915, where it is figured under the name of** *Holaster simplex*.

ovate, its three dimensions being represented by the formula

$$\text{Length} > \text{Breadth} > \text{Height}.$$

This formula, except in a few extreme cases, holds also for *Echinocorys*.

The species was first described by Cragin in 1893, and in the following year he pointed out that 'it frequently occurs in groups, so that what has appeared rare or absent in a horizon may, by some fortunate find, become locally abundant.' This is stated to be also characteristic of *Holaster simplex*

Shumard, to be discussed below, and it is certainly a feature of *Echinocorys*, though it is also typical of most urchins.

Lambert [1903b] pointed out that the species was related more closely to *Echinocorys* than to *Holaster*, and for it he proposed a new genus, *Craginaster*.

In 1915, Clark and Twitchell united this and other species, and gave them the name *Holaster simplex* Shumard, but Lambert, in 1927, criticised this action, and gave the opinion that not only were they separate, but that they were generically different. He did not, however, retain his previously suggested name of *Craginaster*, but placed the species in the genus *Pseudananchys*, thus confirming an earlier opinion of his [Lambert and Thiéry 1909].

Adkins, in 1928, agreed with Lambert in referring the species to *Pseudananchys*.

The problems raised by this and other passage forms are always difficult. We have the alternatives of dividing them arbitrarily between the two extreme genera, or of erecting new genera to contain them. It is difficult to understand how the species under discussion can be united with *Pseudananchys algira* in one genus, since the two are in many ways so very different. The American species is in fact close to a typical *Holaster*, whereas the other is practically a true *Echinocorys*. Indeed, it has already been pointed out that, especially in the lower zones, *Echinocorys scutata* exhibits features reminiscent of *Holaster*. The difficulty is that we cannot draw a hard and fast line between the two genera, and it seems better to adopt the first suggestion above, and to place all intermediate forms in one or other of the extreme genera. In any such classification, the presence or absence of a sulcus must be taken as practically conclusive. In *H. completus*, that feature is present, though it is obsolescent. In *P. algira* the sulcus is absent, although there is some flattening of the margin. I suggest, therefore, that the latter species be replaced in the genus *Echinocorys*, but separately from *E. scutata*, since it has one or two primitive characters.

Holaster simplex.

Holaster simplex Shumard 1853.
Holastre simplex Desor 1858.
Holaster simplex Clark 1891.
H. simplex (*pars*) Clark and Twitchell 1915.
H. simplex Lambert 1927.

Also possibly

Holaster comanchesi Marcou 1858.
Holastre comanchesi Desor 1858.
Holaster comanchesi Adkins 1928.

The last species which was discussed was Lower Cenomanian

in age, and the one which now has to be considered comes from the Duck Creek and Fort Worth Formations, which are Upper Albian. This *Holaster* is ovate and gibbous and has a definite sulcus which is, however, shallow and rounded. It also possesses a sub-anal fasciole, a feature which connects it with the genus *Cardiaster*. Shumard suggested a connection between this species and '*Ananchytes*' *fimbriatus* Morton [1830] from the Senonian of New Jersey, a species which d'Orbigny [1853] later placed in the genus *Cardiaster*. Forbes, who first introduced the name *Cardiaster*, had recognised it as a form intermediate between the true Spatangids and the genus '*Ananchytes*' which then included not only *Echinocorys* but also the *Holasters* and *Offasters*.

Holaster comanchesi Marcou is closely related to *H. simplex* and it was chiefly the fact that it has straight ambulacra, whereas those of *H. simplex* are flexuous that caused Marcou to erect a new species. Like the other species, it bears a resemblance to *Cardiaster fimbriatus*. The author describes it as having points of similarity with *H. subglobosus* Leske [1778] and particularly with *H. trecensis* Leymerie [1842], and this gives us a link with European species.

Clark, in 1891, was of the opinion that *H. comanchesi* was identical with *H. simplex*. Clark and Twitchell in 1915 not only united the two, but also included several other species, among them *H. completus*. Concerning the species *H. simplex* as understood by these authors, it is stated that ' the variations in this species are very pronounced, some of the individuals being high and globose and others low and flat. A critical examination of a large number of specimens affords no satisfactory criterion for the recognition of the new species established by Marcou and Cragin.' This statement is highly reminiscent of *Echinocorys*. *H. simplex* is stated to be very like '*H. lævis* var. *planus*' from the European Cretaceous, but is more elevated and is distinctly broader posteriorly.

Adkins, in 1928, referred to two shapes of test, one with the greatest perimeter at the base (the ' low phase ') and the other with the greatest perimeter above the base (the ' tall phase '). He retained *H. comanchesi* as a separate species and referred to a type specimen stated to be in the British Museum. The registered number quoted by him appears to be wrong, and I have not succeeded in seeing the specimen.

Conclusions.

The following suggestions are made as to the ancestry of British *Echinocorys* :

1. The evidence of its distribution suggests that *Echinocorys* entered the British area in the late Turonian by immigration from the West.

2. *Echinocorys* was probably derived from an American species related to *Holaster completus* Cragin (Lower Cenomanian).

3. The latter species was closely related to *Holaster simplex* Shumard (Upper Albian), from which it was probably derived.

4. *Holaster simplex* has affinities with the genus *Cardiaster* which connects the *Echinocorythidæ* with the *Spatangidæ*.

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Lundy, Isle of Puffins, by **Richard Perry,** pp. 267, with 37 photographs by Alan Richardson, and a sketch map of the island. Lindsay Drummond, 12/6. This is a most painstaking study of the sea birds of Lundy, where the author spent five months in 1939. Although there must be a good deal of ' roughing it ' in Mr. Perry's methods of open-air study, it is fairly obvious that he enjoys it and one cannot imagine him ever settling down to life in a town. Bird watching is with him a passion, and his successive writings more and more reveal a complete absorption in the subject. It goes without saying, therefore, that this is a book which will be read with avidity by all field ornithologists. Mr. Perry has always written well, and he excels himself in this volume. It is given to few trained bird watchers to make daily observations for several months on such species as the Puffin, Guillemot, Kittiwake, and Razorbill, and here is presented such a study, given with a rare wealth of detail. The author has collected a lot of material relating to migration and his conclusions are well worth studying. In collecting together the known facts of migrations, Mr. Perry points out the need for wide research on a large scale. He thinks that the key to the unexplained power of orientation possessed by birds (and he might well have included a large number of other animals) might be sought for in an investigation of the reactions of a bird's organism to electro-magnetic and meteorological forces. Mr. Richardson's photographs, both of the island and of the birds themselves, are superb.

1 Feb. 1941

YORKSHIRE COLEOPTERA IN 1940

W. J. FORDHAM, M.R.C.S., L.R.C.P., D.P.H.

LITTLE work has been done in the study of the Coleoptera of Yorkshire during the year, but two species new to the county have been taken.

Articles in *The Naturalist* are 'Aquatic Coleoptera of the Goathland District,' '*Rhagium bifasciatum* Fab. a. *infasciatum* Pic.'', and ' Six *Phyllobius* aberrations new to Great Britain,' by Mr. Kaugmann, ' British aberrations of *Rhagium bifasciatum* F.' by Mr. Bayford, and ' *Pyropterus affinis* and its distribution,' by the writer.

Lists of beetles taken on the excursions of the Yorkshire Naturalists' Union to Queen Mary's Dub (71 species), Kirkburton Valley (21 species), and Skipwith (59 species) are given in *The Naturalist*.

Beetles in the following list have been taken by :

M.D.B.	M. D. Barnes, Huddersfield.
E.G.B.	E. G. Bayford, Barnsley.
W.D.H.	W. D. Hincks, Leeds.
R.R.U.K.	R. R. U. Kaufmann, Goathland.
A.S.	A. Smith, York.
T.S.	T. Stainforth, Hull.

The two species new to Yorkshire are :

Liparus coronatus Gz. Strensall Common (62), 1939 (A.S.). This is a rare species not previously taken north of Suffolk. Fowler says that it is found in moss, under stones, often crawling on roads and on grass stems. It is also found on umbelliferæ, especially *Chærophyllum sylvestre*. The larva occurs in the roots of *Daucus carota*. It is widely distributed in the south of England and also occurs in Ireland.

Gymnetron melanarium Germ. Pickering (62), 6/40 (M.D.B.). A very local species occurring on *Veronica officinalis* and not taken previously north of Grimsby, Lincolnshire.

Additional localities for species already in our list are :

Carabus spp. Mr. Bayford writes : ' In my garden I usually have numbers of *Carabus nemoralis*. For many years they have been more numerous than *Carabus violaceus*. This year I have not seen one of the former and not many of the latter, and as I have given up collecting them long ago over collecting is not the cause of the scarcity.

Lebia chlorocephala Hoff. Strensall Common, 1939 (A.S.).

Hygrobia hermanni F. Kelsey Hill (61), 2/11/1940 (T.S.). Evidently still endemic in the Hull district.

Dianous caerulescens Gyll. Scaleber Foss, near Settle (64) by stream, 6/40 (M.D.B.).

Anisosticta 19 *punctata* L. ab *thoracica*. Worsborough Reservoir, near Barnsley (63), 9/40 (E.G.B.). The type has been taken at Askham Bog, York and Doncaster district.

Thymalus limpatus F. Hovingham (62), beneath oak bark, 31/3/40 (M.D.B.).

Glischrochilus 4-punctatus L. Hebden (64), beneath bark of felled pine, 27/4/40 (M.D.B.).
Agathidium nigripenne F. Hovingham (62), 31/3/40. Hebden, 27/4/40 (M.D.B.).
Limnius tuberculatus Mll. Low Common, near Penistone (63), 8/5/38 (M.D.B.).
Cryptohypnus dermestoides Hb. Common in sand by Little Don River, Langsett (63), 6/7/40 (M.D.B.). New to V.C. 63.
Mezium affine Boield. Warehouse, York (A.S.). Only recorded from Leeds and York.
Bruchidius cisti Pk. Sweeping *Helianthemum*, railway side, New Bridge, Pickering (62), 8/40 (M.D.B.).
Plateumaris discolor Pz. Sawley, Ripon (64), 7/7/40 (M.D.B. New to V.C. 64.
Cryptocephalus aureolus Suff. Three on *Hieracium*, Haugh Howe, Pickering (62) (M.D.B.). Only recorded from York. New to V.C. 62.
Phyllobrotica 4-maculata L. Common on skullcap, Askham Bog, 9/40 (A.S.).
Lupcrus flavipes L. Sawley, Ripon (64). Sweeping, 7/7/40 (M.D.B.). New to V.C. 64.
Galerucella viburni Pk. Abundant on *Viburnum opulus*, Haugh Howe, Pickering (62), 15/9/40 (M.D.B.).
Galeruca tanaceti L. Barnsley (63), 7/40. Crawling on roadway (E.G.B.).
Phyllotreta tetrastigma Cm. Coxley Valley, near Wakefield (63), 18/5/40. One on *Cardamine amara* (M.D.B.).
Aphthona herbigrada Ct. New Bridge, Pickering (62), 8/40. On *Helianthemum*, abundant (M.D.B.).
Psylliodes picina Mm. Pickering (62), 8/40 (M.D.B.).
Hallomenus binotatus Qn. Leeds (W.D.H.). Taken at Cusworth, near Doncaster, and on several occasions in the Leeds district.
Rhynchites aeneovirens Mm. West Beck (62), 7/39 (R.R.U.K.).
Otiorrhynchus raucus F. Pannal Ash (64), 6/36, Goathland (62), 7/39 R.R.U.K.). Only previously from Thorp Arch.
Phytonomus variabilis HB. Pannal Ash (64), 5/36, Goathland, 5/39 (R.R.U.K.).
P. plantaginis D.G. Bolton Abbey (64), 14/7/40 (M.D.B.).
Anthonomus inversus Bd. Greta Bridge (65), 4/37 (R.R.U.K.). New to V.C. 65.
Orobites cyaneus L. Haugh Howe, Pickering (62), 12/5/40 (M.D.B.).
Rhinoncus gramiineus Bd. Pickering (62), 8/40 (M.D.B.).
Cryptorhynchus lapathi L. Swept at watercress beds, Keldhead, Pickering (M.D.B.), 8/40.
Baris lepidii Germ. Pannal Ash, 6/36, 7/37, Goathland, 5/39. (R.R.U.K.). New to V.C. 62, only recorded from York.
Hylastes cunicularius Er. Thornhill (62), 5/39 (R.R.U.K.). Only recorded from Buttercrambe.

REVIEWS AND BOOK NOTICES

The Birds of South Africa, by **Dr. Austin Roberts,** pp. xxxii+ 463 with 56 plates of coloured figures by Norman C. K. Lighton. Published for the Trustees of the South African Bird Book Fund by H. F. & G. Witherby, 30/-. Dr. Roberts has just the right qualifications for the authorship of a monumental work of this character. He has studied South African birds all his life, and the Union Government and the Transvaal Museum arranged for him to give full time over a period of four years for the preparation of the text. His labours have been united to those of Mr. Lighton, who has drawn 1,032 separate figures in colour. Many North Country naturalists have South African connections,

and a book of this kind is a most valuable work of reference for all interested in the avifauna of lands overseas. It is the only available comprehensive guide of its kind, and it is very unlikely that it will be replaced for many years to come. The coloured figures are remarkable for their accuracy and clearness. Although the average number of drawings on one plate is nearly twenty, the work is so well executed that all distinguishing characteristics are plainly indicated, and the figures will easily stand the magnification of a large reading glass. In addition to the international systematic nomenclature, readers will find the common names in English, Afrikaans, and Eastern Bantu and Native languages. It may interest readers to note among families selected at random that in South Africa one may expect to see about twenty different swallows and martins, ten cuckoos, and twelve owls. The price of the volume is so modest that it is no surprise to find that it is due to the generosity of subscribers that the book is offered for sale at approximately half its actual cost.

The Personality of Animals, by **H. Munro Fox, F.R.S.**, pp. 123, with 16 photographic plates. Allen Lane Pelican Books, 6d. It is deeply significant that the publishers of the Penguin Books have brought out a thoroughly scientific primer on animal intelligence and behaviour at the low price of 6d. Professor Fox gave weekly broadcasts to schools over a period of two years and this little book is more or less founded on these talks. The thirteen chapters are entitled The Animal's World, How Animals Communicate, What some Animals can Hear, The Colours that Animals can See, Strange Senses, Play, Why do Birds Breed in the Spring? Animals that Find their Way Home, Racing Pigeons, Can Animals Count? Social Rank, Instinct, and Intelligence. All naturalists should secure a copy of this book before it goes out of print.

An Anthology of Animal Poetry, compiled by **Kenneth A. Mason**, pp. 142. Allen Lane Pelican Books, 6d. Mr. Mason, who is not yet twenty, began this anthology while still at school. The publisher's description accurately indicates the scope of the books: 'This is a collection of just over a hundred poems about beasts, birds, insects, reptiles, and fish. They range from simple description and even nonsense verse to some of the highest flights of philosophic fancy, and the anthology as a whole offers a new refreshing cross-section through the almost limitless wealth of English poetry.' It is very good value for 6d.

The Food of Coarse Fish, Scientific Publication No. 3 of the Freshwater Biological Association of the British Empire (1/6) is a short but very interesting interim report on some of the results of the research into the biology of the British coarse fish which has been undertaken by Mr. P. H. T. Hartley. Tables and graphs are given which clearly show the composition of the food of eleven species of fish. Unfortunately in the case of many of these species the numbers of individuals examined were only small (less than 100 individuals of five of the species were dissected), but in one or two cases, notably the bream and the roach, the examination has been very thorough. In the case of the roach it has been possible to compare in some detail the feeding habits of different sizes of fish at different times of the year and in different localities, and the conclusions reached are that, although this fish is omnivorous and eats much vegetable food, the younger fish tend to feed more on plankton and the older ones more on molluscs. The paper concludes with an interesting discussion on the ecological position of the fishes examined. It is shown that, with the exception of the pike and the ruffe which are entirely carnivorous, most of the coarse fish show diets so varied 'that it is almost impossible to assign to any one species a type of food necessary for its existence.'

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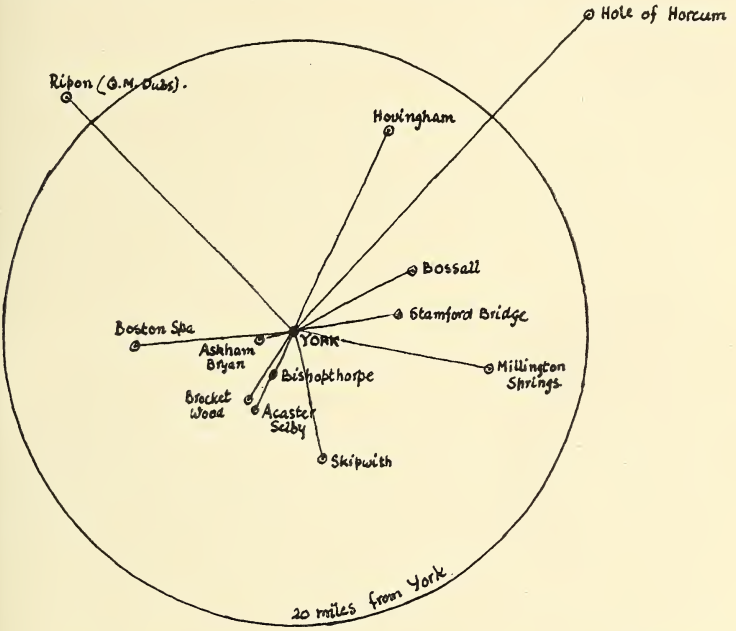
ACANTHINULA ACULEATA MÜLL.

ELSIE M. MOREHOUSE

THE accompanying diagram gives a good idea how *Acanthinula aculeata* Müll. is distributed around York. Mr. C. F. Sweetman sent it with his records for 1940. It shows what



intensive work will accomplish and where this beautiful little mollusc is to be found.

Owing to the structure of the shell and its mode of living it may easily be overlooked. The epidermis is raised into ridges in the line of growth and on these are very fine spines to which soil adheres, so owing to its size, $2\frac{1}{2}$ mm. by $2\frac{1}{2}$ mm., and the camouflage of soil, it is often passed by for a small lump of dirt.

I always recall the thrill of my first capture. It was in Devonshire on the top of a wall, about 3 ft. high, which supported a steep bank at its base. By lifting up the blades of grass and looking carefully my first specimens were revealed.

The Entomologist for January contains 'More Hebridean Days: II, The Isle of Benbecula,' by J. W. H. Harrison; 'Records of a New Forest Moth Trap,' by C. W. Mackworth-Praed; 'Irish Lepidoptera in 1939,' by B. P. Beirne and A. A. Lisney; 'Some notes on the Cynipid genus *Andricus*, II,' by M. Niblett and numerous notes and observations.

APR 3 1941

UNIVERSITY OF LONDON CERTIFICATE IN NATURAL HISTORY

Just before the outbreak of war the University of London, in response to an expressed demand, instituted a Certificate of Proficiency in Natural History designed for teachers who require an additional qualification testifying that they have a practical working knowledge of natural history such as will be of special value in teaching it to children up to the age of fifteen. The necessary studies involved attendance at a course of lectures and laboratory work of about 300 hours duration, together with a certain amount of organised field work. Considerable interest was shown in the University's new departure and some education authorities were prepared to arrange suitable courses, but the dislocation of the school teaching services all over the country has brought about the result that the courses of study contemplated by the University are not suited to the present-day circumstances of teachers.

Consideration has therefore been given to the possibility of devising some special emergency regulations which would meet the intention of the original requirements and make the best use of the fact that large numbers of urban schools are now located in the country or at the seaside and so presented with an opportunity of natural history study in the field which under normal peace-time conditions would have been impossible ; as a result emergency regulations have been drafted. The main principles of the proposed new regulations are (*a*) to substitute for the present lecture-laboratory requirement a directed course of private reading together with attendance at a fortnight's summer vacation course arranged by the University, and (*b*) to take advantage of the teacher's probable extended period of residence in rural conditions by putting the main emphasis on the work in the field, involving the writing under expert advice of a substantial essay on some specialised topic chosen by the student.

At the moment, however, the University has no evidence as to how far such a scheme would be welcomed by those teachers who might have been expected under normal conditions to have studied for the original certificate. Any teacher, therefore, who is interested in the proposed new scheme as outlined is invited to communicate with the University Extension Registrar, University of London, at Royal Holloway College, Englefield Green, Surrey.

The Entomologist's Record for December contains plates of larvæ of *Iodis lactearia* and *Pseudoterpna pruinata* ; ' Notes from an Entomological Diary,' by a breeder ; ' The genus *Zygæna* in the Western Isles of Scotland,' by J. W. H. Harrison ; Collecting Notes, Current Notes and Supplement, ' The British Noctuæ and their varieties,' by H. J. Turner.

THE BEHAVIOUR OF A GROUP OF RESIDENT BRITISH STARLINGS (*STURNUS* V. *VULGARIS* LINN.) FROM OCTOBER TO MARCH

Averil Morley

Introduction.

From October, 1937, to March, 1938, a group of resident Oxford starlings was regularly watched, mainly before 9-30 a.m. and after 1-45 p.m., from a top-storey room opposite the three buildings which they occupied and which are referred to as I, II, and III. With constant watching it became quite easy, both by means of behaviour and appearance, to tell the various individuals apart. However, it must be stated that there were some sequences of activity in which the participants were not clearly identified, or in which the recognition of individuals was lost. Although much attention has been paid to the behaviour of the large immigrant winter flocks, few observations on the behaviour of resident British birds in this period of the year have previously been published.

Observations.

From the beginning of October to mid-November the group of birds under observation consisted of four unmated males and a pair, and song and territorial squabbles, accompanied by the anger note ' krarr,' were common. Apart from these, however, there was no display of emotion, the birds just sitting on the chimney-stacks which they used as song-posts. Activity in these areas was mostly over by 9 a.m. Building I was occupied by the male IA, the tree nearby and the building II by the male IIA, and the building III was occupied by the pair IIIA male and IIIA female, who were dominant to the two other males, IIIB and IIIC, on this building. The male IIA confined IA strictly to his own building and met his attempted invasions on to the tree or the building II by either intimidation or direct attack. The pair IIIA male and IIIA female also kept the males IIIB and IIIC confined to their own particular chimney-stacks. In contrast with this, however, all the birds showed little resentment to casual visitors in their territories and on their chimney-stacks. Sometimes, however, by a hunched still pose, or with the head and neck drawn up, they showed tenseness or alert uneasiness at the invasion. These visitors often attracted others, until six or ten birds were bunched together, only after a minute or so of doing nothing to drift away leaving the owner alone. The apparent recognition of individual neighbours agrees with the observations of Nice (1937) on the song sparrow, *Melospiza melodia euphonia* Wetmore.

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The areas claimed by the male starlings as territories were small, and as they only included the roofs, they were valueless from the point of view of food. Their approximate sizes were as follows : Ia male (before November 22nd), 48 square yards ; Ia pair, 368 square yards ; IIa male, 320 square yards ; IIIa pair, 125 square yards ; IIIb male, 49 square yards ; IIIc male, 13 square yards. The birds shared the same food supply in the nearby gardens. The pairs and the single birds appeared to feed fairly independently of each other, but whenever food was thrown out of the houses the flight of one bird towards it immediately attracted the others. This reaction overcame all other forms of behaviour.

About 50 yards from the back of the buildings was a line of trees which were used, especially later, for social song and displays, and there was a constant interchange of birds between the private song-posts and these communal trees.

In mid-November came a very cold period in which the temperature reached a minimum of 21° F. This cold was probably the cause of a temporary desertion of the chimney-stacks as on November 22nd, when the cold relaxed a little, all the birds returned except for IIa male. His large area remained vacant until, after a period of approximately ten days, it was completely absorbed by the Ia male. On November 24th two females appeared on the roofs. Unlike the mated IIIa female, these new birds wandered about, seemingly merely attracted by the presence of the other birds. On the day of their appearance both females made an attempt at ' branch-running ' towards the Ia male on his tree, so recently acquired in the absence of the IIa male. The ceremony of branch-running usually starts by a pair alighting on a tree. The lower bird, which as far as is known is always the female, proceeds to chase the other in a series of running hops and springs up the tree, sometimes with ducking and bobbing motions. When they reach the top of the tree the male commonly takes flight followed immediately by the female, or if he remains, they sit side by side together, and she may appear to thrust herself beneath him in attempted coition. This ceremony has been seen in Sussex as early as November 20th. By November 30th only one of the females completed the run up the branches to the Ia male on his tree, and by December 1st the other had transferred her interest and was making many visits to the IIIb male on his stack. Her effect on him was curiously most marked after she left him. Though he might be silent before and during her visit to the chimney, when she left he burst into vehement song which was accompanied by the characteristic energetic wing-waving. When both were there together they often sat closely side by side preening. Another sign of general, and

therefore less intense, excitement which appeared at this time was ' bill-wiping.' It was used at any raising of the emotional level such as trespassing, meeting trespassers, pauses in branch-running, leaving or returning to song-posts, re-union of mates, or simply seeing another starling with food. The action merely consisted of the bird vigorously and repeatedly wiping its bill on its perch. The appearance of this behavour coincides with the beginning of the change in bill colour.

Throughout December, when not on his chimney-stack song-post, IIIB male and the female now attached to him often invaded IA's tree, which caused much disturbance as they were constantly turned off again by the newly-formed pair. Perhaps their anxiety to get to the tree was connected with a desire for the rite of branch-running, for there was no tree in IIIB's area. The female seemed especially eager and usually initiated the trespass.

After December 2nd the birds were often seen occupying their roof areas after mid-day, and from December 22nd the males always visited their song-posts for one or two minutes (the period becoming longer as the days went by) before going off to the communal roost outside the city. During these visits the birds displayed by bill-wiping, wing and tail flicking, and by song.

The first starlings copulating were seen in another part of Oxford on January 2nd. The female, reaching the male after a long branch-run to the top of a very tall lime tree, pushed herself underneath him, the male meanwhile wildly waving his wings. He then chased and chivvied two other starlings from the vicinity of the female, and it seemed that his excitement excited them, so that all three raced about the tree with wings energetically flickering. On January 8th coition was first seen in the observed group between the IIIB pair. The female, arriving in the morning after roosting, dropped on to the male's chimney-stack where he was preening, and pushed herself against him. He climbed on to her back, waving his wings wildly, but when he tried to repeat it, she slipped from under him and flew to the communal trees. He followed close behind and seemingly tried to mount her in the air.

Also on January 8th ' plumage-shaking ' was seen for the first time in the observed area by the IIIB male who was much excited by an invader in the presence of the female. In plumage-shaking the body is held more or less horizontally and the whole plumage is violently shaken as after a bath. Perhaps at close quarters the spots and gloss of the plumage add to the effect. This behaviour shows a greater intensity of feeling than bill-wiping and appears to be about equal to ' violent preening ' in which the bird grabs and pulls at

feathers on any part of the body. Bill-wiping, tail and wing flicking, plumage-shaking, and violent preening were the basic components of the bouts of mutual display between pairs which were occurring increasingly about this time. Sometimes the pair displayed in this manner after ousting an interloper, but very often the behaviour seemed spontaneous. However, the fact that eviction of interlopers caused the members of the pair to display to each other seems to show that invasions of territory have a definite biological purpose of stimulation, the importance of which in such close-nesting species as the starling may well be great.

From early January the birds forsook the distant roost and remained at night in their territories. In the case of the IA pair, who were the first to do so, the first occasion was on January 6th (Morley, 1939). From January 26th the males paid many visits to their own nest-holes in the early morning, and also showed much interest in neighbours similarly engaged. The IA male, being mated, always objected to the visits of other males and dashed out to rout them with loud anger-cries. This agrees with Marples' observations (1936) on the behaviour of mated males. The IA female showed her interest in the male's visits by sometimes accompanying him to the front of the hole, but she did not enter it on these morning visits until February 5th. There were deliberate visits by birds of both sexes to their neighbours' territories, and the response to these visits might be repulsion or simply display. The visitors were often difficult to get rid of, and the vigorous pokes of the owner's beak often had no effect.

Throughout January and February, even when in their own territories, the birds became increasingly restless, moving about from perch to perch in rapid succession. Absolute synchronisation of movements throughout the day became a feature of the mated birds, so that they appeared and disappeared from the trees and roofs constantly together. They rose together in the morning, and the failure of one bird to go to roost at the same time as its mate threw the whole of that train of behaviour out of gear (Morley, 1939). The birds also spent much time on the communal trees. Here, following the lead of one bird, the whole group of birds would display together, one displaying bird moving up to another.

The IIIB pair were now the only birds without a hole in which to roost. The IIIA male strongly objected by voice and action to their visiting or roosting in a hole on the common boundary of their areas, though he himself was never seen to use it. The IIIB male displayed alone before this hole and visited it when he could, and though he and his mate tried to roost in it, they were too much harried by the other pair to be successful more than once. Meanwhile IIIC male was

markedly behind the other birds in the amount of time spent in his song-post area, but from February 6th a great change took place in his behaviour and at this time he was first seen wing-waving during song. On February 16th he began displaying, and on the 18th he started to take a lively interest in the Ia and IIIa females. He also often visited a hole in his piece of roof, and he became a great frequenter of the communal trees.

On February 14th Ia female was seen pulling grass out of the roosting-hole. No material was seen taken in, but Marples (1936) found that this was done by the male and that the material was thrown out again by the female. On February 23rd the Ia male was seen to perform an action which later became commoner, and which was repeatedly seen up to April. The male drew himself up with throat feathers puffed out and beak pointing upwards. The wrist joints were held away from the body, and the wings, hanging down, were shaken four or five times in front of the female. Except for the wing action, this was similar to the pre-coitional attitude observed by Kluijver (1939).

During February the IIIb pair, which had unsuccessfully tried to roost in the disputed hole, became more and more disorganised and desynchronised in their comings and goings. The identified appearances of the female became fewer and fewer and in the last week of February they ceased entirely. During her long absences and after her disappearance, the male showed revived interest in his song-post like an unmated bird. He also took great interest in the Ia pair, and accompanied their daytime visits to their roosting hole. This they much resented, though the Ia female paid him visits and displayed with him on his stack. He also displayed alone, like the IIIc male, on his chimney-stack and in front of the disputed hole.

By the end of February and the beginning of March, when close watching had to stop, the birds were extremely restless, and this made observation very difficult. There were incessant bouts of display, of dashing about, and of hole visiting, and these activities took place especially just after rising and before retiring to roost. One or two hours at these times were spent in this especially excited activity, and it is interesting to compare this with the scant one or two minutes of emotional display by the males in December before going to and after returning from the communal roost. There were indications that, in mid-March, this wild behaviour changed to long periods of quiet sitting about, but proper data during this period could not be collected.

Throughout the whole period of watching there were large flocks of starlings feeding on nearby pasture land, and although

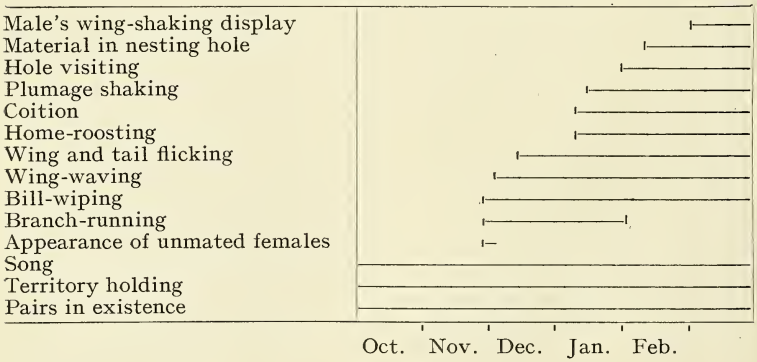
these were not intensively studied, they showed no sign of the display and general behaviour of the starlings within the observed area.

Summary and Conclusions.

1. A group of resident starlings was watched in Oxford from October to the beginning of March. One pair was in existence from the start. Two more pairs were formed after November 24th, but one of these was ultimately broken up in February so that only the male remained. The other two males, one of whom disappeared, were unmated.

2. From the beginning each male claimed an area of roof as a territory and the chimney-stack thereon as a song-post. As these territories were entirely valueless for food and, until January, for roosting, the occupation of the roofs in autumn is basically sexual. The small amount of flock-life and the marked sexual activity of these birds differs from the experience of Kluijver (1933, 1935) in Holland. It agrees, however, with the account given by Bullough and Carrick (1940) of the onset of sexual activity which accompanies the first increase in size of the gonads of resident British starlings in October.

3. Sexual activity increased in January and February, and accounts are given of the various behaviour trains and the times at which they were first observed. These may be summarised in a table :



4. There was a marked difference of behaviour between the resident Oxford birds, which were certainly British, and the birds of the large flocks which were seen on nearby pasture land. Carrick and Bullough (unpublished) have shown that adult British starlings are non-migratory, and it is very probable that the birds of the large flocks, being unattached

to any nesting-holes, song-posts, etc., were mainly of Continental origin. The lack of any display by these latter birds agrees with the theory put forward by Bullough and Carrick (1939, 1940) that the Continental immigrant starlings present in the British Isles in autumn and winter have much smaller gonads than have the British birds, and that therefore the foreigners show little or no sexual activity.

ACKNOWLEDGEMENTS.

The writer is greatly indebted to Dr. W. S. Bullough for his encouragement and invaluable help in the preparation of this paper. Reports on previous work on the starling were obtained from the library of the Edward Grey Institute of Field Ornithology, Oxford.

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Piebald Blackbirds and Rook at Huddersfield.—A piebald male Blackbird has come daily to my garden since November 11th, 1940. The whole of the head and neck to the shoulders is practically white, which, in contrast with the ordinary plumage, makes the bird very conspicuous. A still more handsome piebald male frequents the grounds at Thorn Bank, Hall Bower. The whole of the head and neck down to the shoulders and the right wing are almost wholly white. Following the severe frost during the night of January 4th, 1941, several Rooks visited my feeding ground and among them was an aged specimen whose tail showed many white feathers.—W. E. L. WATTAM, Newsome.

Growth of Lunularia cruciata D.—In 1939 my attention was called to an extraordinary growth of this liverwort in

part of the garden surround of a residence in Blackmoorfoot Road, Crosland Moor (V.C. 63). The garden border faces due east, is 21 ft. long by 4 ft. wide. In May the basal stones of the boundary wall displayed scattered plants of this liverwort. The soil of the border is of a sandy porous nature. The whole border was planted with Gladioli and Ten-weeks Stocks, a slight dressing of bone meal being given at the time of planting. No attention was subsequently given to the border and the planting scheme was not a pronounced success. This was due in part to the nonaeration of the soil and no check being made upon the rapid growth of this liverwort. By October 11th, 1939, the whole of the border was an unbroken sheet of vigorously growing liverwort plants save for the weakling flowering plants. The gemmæ cups were uncountable. This rapid growth was doubtelss helped by the constant rainfall of the summer period and lack of sunshine. I am indebted to Dr. J. Grainger for making a test of the soil, which he reported was *p*H 7·5 and slightly alkaline.—W. E. L. Wattam, Newsome.

The Brambling at Castle Howard.—Sunday, January 5th, was bitterly cold and snow lay on the ground to a depth of 2 in. or more. It lay undisturbed under the lime trees in the great avenue through the park, but under the beech trees the ground was richly coloured by the dead leaves and the snow had almost disappeared. All was then quiet but surely this was the work of the Brambling and about half a mile further on we were able to confirm this and witness the sequence of operations. A flock of about fifty Bramblings flew down to the ground below a beech tree and each at once plunged head first into the snow and with a rhythmic action of the head and wings fifty little snow ploughs went into action, throwing the snow up and behind, exposing the dead beech leaves of last autumn and these again were quickly scattered in a search for beech masts. Bramblings possess that power of widely scattering dead leaves by a flick of the beak that is so characteristic of the Blackbird when feeding among the dead leaves. In a few minutes the worked areas merged and the leaves were exposed over an almost continuous area beneath the tree when the flock flew off to a new site. At least five parties of from 30 to 50 birds were at work along the avenue and the ground under almost every beech tree had been disturbed. The birds never made the mistake of burrowing under the lime trees. The only other species interested in the evacuations was the Great Titmouse, and parties of about half a dozen had attached themselves to the flocks of Bramblings and were copying their tactics with considerable success.—E. Wilfred Taylor.

BRITISH CARRION BEETLES

A Research on and a Critical Analysis of the Horticolous Necrophagous Coleoptera found in Pannal Ash, near Harrogate, during the years 1936-1939

RAYMOND U. KAUFMANN

'. . . sehr erfolgreich ist das Eingraben tiefer glasirter Toepfe, ueber die man das Aas mit Dornen und Reisig beschwert legt : was in den Topf faellt kann nicht mehr heraus.'—C. G. CALWER.

INTRODUCTION

DURING the course of the year 1937 the Editors of *The Entomologist's Monthly Magazine* published three papers of mine on the present subject. These papers were, in effect, a summarised form of the conclusions then arrived at after a year's investigation of the necrophagous coleoptera found in Pannal Ash. The analyses, interesting though they were, were as restricted as possible.

Since writing those papers, however, a third year of research was brought to conclusion ; further useful data of comparative value were assembled ; and while the opportunity to continue the work in the same locality became impossible, this longer memoir, containing the entire details of the work undertaken and at some greater length, is offered in the hope that it will kindle among entomologists interested in this aspect of the subject the desire further to investigate the activities of carrion beetles.

EXPERIMENTAL METHODS EMPLOYED

It is nearly nine years since I first attempted an investigation of the movements of coleoptera associated with carrion. Interest in these beetles had been greatly aroused after reading G. B. Walsh's ' Studies in the British Necrophagous Coleoptera.'[1] At that time I was living in the north of London in a district apparently singularly devoid of carrion beetles, and it was determined to set up an apparatus similar to the one used by Walsh so that a better survey of the district fauna might be made. Accordingly, towards the end of March, 1932, a number of large stone jam jars, in which pieces of chicken fat and lights were suspended from a metal tripod, were buried in the flower beds of the garden. The jar lips were flush with the ground and covered with boards to keep out the rain. These necrophagous traps flourished for some six to seven weeks, and their insect contents were inspected regularly. The jars were interred on the sunny side of the garden, although the weather throughout the period was dull and rainy.

[1] See Bibliography.

In all some ten examples of Staphylinidæ were obtained from the traps, together with just over a score of *Pterostichus madidus*, two *Nebria brevicollis*,[1] a few *Carabus nemoralis*, one *Necrophorus humator*, and a very short series of common smaller Silphids. These captures were not very satisfactory, apart from the presence of *C. nemoralis*, which I had till then never observed in London, despite Hall's claim that they were abundant in suburban gardens,[2] and that of the *Necrophorus*. Towards the end of May the traps were discontinued, and it was decided to set up another in a nearby piece of wasteland. A secluded locality under the shade of a large tree in a small plantation facing north-east was chosen. This particular trap was more successful, and the data were just beginning to become interesting when some person unknown discovered its position and removed it bodily ! During the two months of its existence, however, several *Catops*, Staphylinidæ, *Necrophorus vespillo* (again new to me), and *Pterostichus madidus* occurred, in addition to *N. humator*, and a single specimen of *Geotrupes stercorarius*, which was found dead in the liquefied bait at the bottom of the trap. This latter was indeed a curious capture, but, as will be seen in the remarks which follow, such occurrences of coleoptera not normally associated with carrion at all are by no means unique.

It was not until April, 1934, that attention was again given to the study of necrophagous coleoptera. In the meantime I had moved to Pannal Ash, near Harrogate. During that month two jars, similar to the ones described, were embedded in a westerly corner of the grounds of Pannal Ash College. Their position was a sheltered one, and the bait consisted of cooked meats of various kinds. They were not examined with such frequency and were only cleared out once a week on the average. The weather was fairly typical for the time of the year, and during their ten weeks of existence the following comparative data with the London traps were recorded : some 150 *P. madidus*, 18 *P. vulgaris*, 14 *P. strenuus*, 9 *N. brevicollis*, 8 *Bembidion ustulatum*, 2 *Agonum dorsalis*, 3 *Calathus fuscipes*, some 20 various Staphylinidæ, 9 *Catops* specimens, and 12 *N. humator*. During this time quite a number of field mice fell into the traps—the only occasion when interference from mammals of this type was ever recorded. Extraneous affairs prevented the continuance of these quite fruitful traps, and in any case, shortly afterwards they were again interfered with by someone and removed.

From these first experimental essays it will be seen that their research value was hardly appreciated by the outsider,

[1] Here, as throughout the paper, no attempt has been made to distinguish between *Nebria brevicollis* Fabr. and *N. iberica* Oliv.

[2] C. A. Hall, *Common British Beetles*, p. 26.

and, of course, the records yielded did not justify publication. These preliminary attempts were, nevertheless, quite satisfactory ; they introduced a number of normally unobtainable carrion coleoptera, and the divers species led one firmly to the conviction that more protracted observations would lead to informative results. References to my own records of carrion beetles collected during long absences abroad endorsed this conclusion, and one may say straightaway that it is only by means of specially baited traps that one can hope to assess both numbers and species of necrophagous coleoptera in any given locality. To supplement this remark it need only be said that while in Switzerland I collected two species of *Necrophorus*, three *Silphæ*, and a very few other Silphidæ ; in Germany I took one *Necrophorus* ; in Belgium no Silphidæ occurred to me at all ; while in this country the presence of any members of the family in the field was a noteworthy event.

Walsh's extensive researches on the necrophagous coleoptera in the Scarborough district are the only systematic ones published within roughly the last thirty years, and previous to his papers (1931, 1933), if one excludes references to the necrophaga scattered through lists published by various entomological periodicals, the only other of real importance is Morley's memoir on the subject (1907). Admittedly, a primitive type of collecting necrophaga is used by entomologists. It is the one of hanging up such objects as old skins and bones, dried carcases, etc. From these baits quite a number of beetles may be collected, even rarities, but the principle cannot be recommended from a scientific point of view. A regular examination of such ' traps ' will certainly inform the experienced entomologist of the types of insects he may expect, but a casual measure such as this cannot but lead to approximations, and one may immediately infer, and correctly, that many species are never recorded or captured simply because their visit to the bait is made at times other than that of the observer. Hence, much material is lost and never reaches the status of a permanent record, and any attempt at an accurate compilation of the necrophagous fauna of the district is quite out of the question. It was primarily such an unsatisfactory condition that moved me to persevere with my own investigations on the British Necrophaga, and it is now possible after three years of experimental work to describe and criticise the horticolous fauna at Pannal Ash. Much as it would have been desirable, no time was found other than for recording purely carrion beetle movements ; the successful rearing of at any rate some of the captures made would have been very gratifying, but one's entire spare time was too fully occupied with the present analyses.

1 Mar. 1941

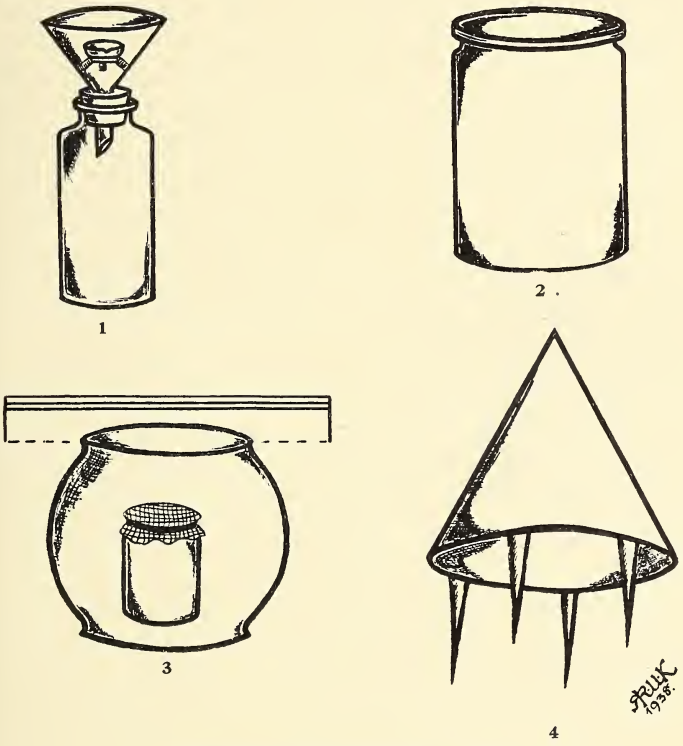
The trials besetting the first experiments have been set forth in some detail. They did, in fact, terminate any further endeavours for some considerable time, and it was not until January, 1936, that yet another and final series of traps was established. This time conditions were far more favourable, and since the interment of these last traps no attempt of a studied nature to arrest the investigation was made ; on the other hand, very useful assistance from a number of people was received.

Following the preparation of the first traps much had been learnt as to the best and most practicable types, and although those finally in use were by no means perfect, a number of improvements were carried out from time to time, and it is to be hoped that the occasion when the ideal trap has been evolved for a research of this nature is not too far distant. The evolution of the traps used is, perhaps, sufficiently relevant to bear discussion, and the accompanying sketches will help to make its explanation clearer. After some thought it was decided not to use the form of apparatus employed by Walsh (Sketch 1). This consisted of a deep and wide-necked bottle with a drilled cork through which a broad-mouthed funnel protruded. Resting in the latter was a pipe-clay triangle with its feet bent downwards to hold it firmly, and in this was fixed a porcelain dish containing bait. Insects, naturally, were attracted by the carrion, and having reached the lip of the funnel they slid down through its spout into the bottle, whence escape was impossible because of the stopper. This is certainly a most ingenious model, but it has one great disadvantage, as Walsh himself admitted. Occasions may arise when a fall of earth blocks the funnel, thus preventing an insect's entry, and past experience has shewn that small mammals such as moles and so on make their way in and remain wedged in the spout, thereby rendering the apparatus completely ineffective.

The simple kind of trap, illustrated in the second sketch, has also been employed by Walsh. It is the type I tried out and consists solely of a large jar of any description sunk into the ground. In the bottom reposes the bait, resting upon a shallow layer of earth. This trap has no great disadvantage except that the presence of the bait itself (if, as Walsh did, it is laid on the bottom) and the soil make the removal of specimens rather awkward, which factor will be discussed presently. Some of the traps of this nature which I used were slightly varied : instead of placing the bait at the bottom, it was slung on a small wire tripod in order to prevent it from touching the earth at the base of the jar.

The third drawing shows the trap which was principally in use, but when these studies commenced in 1936 it had not reached this stage—at that time it consisted of the larger

round jar only. The jar itself was a cheap aquarium with a narrow mouth and bulging sides which effectively prevented the escape of insects once they were inside. In it there rested a smaller jar—actually a pound jam jar—containing the carrion and whose mouth was sealed with a circular disc of galvanised zinc gauze, over which was stretched and bound a piece of close-meshed netting. This trap was found to be the most



Types of Apparatus for Carrion Traps.

successful of all, for the bait was reasonably immune from the attacks of necrophaga.

The fourth diagram shows the final piece of apparatus manufactured. The covers for the traps have always presented no little problem. Walsh protected the mouths of his traps either with a few dry twigs, on which rested a slate tile, with pieces of bark, or else with a stone slab. He complained, however, not infrequently of moisture seeping in and thus ruining his experiments. My own covers were at first large squares of three-ply, weighted down with some heavy stones

to prevent their being blown away during gales and resting on other large stones half-buried round the mouth of the trap so that a gap existed through which insects might comfortably pass. The wood was reasonably satisfactory, but it buckled during the wet weather and became very saturated in the course of time. A heavy glass plate, covered with earth, was then chosen, and this kept the traps very dry indeed. Such a measure, however, is not perfect. Much depends upon how the glass is placed over the trap ; if it does not lie horizontally the danger of rain running into the jar becomes apparent, and great care must be exercised in replacing it over the trap mouth otherwise it may not properly cover the latter. The conical cover finally manufactured was made from sheet tin, which both cuts and solders easily. The shape adopted was based upon that of the ordinary enamel electric light shade, save that the top had no opening. The cover was cut from one piece so as to ensure rigidity when the prong legs were stuck into the ground. By using a sufficiently large cover of this shape ample protection from the elements is certain and the gap through which insects may pass into the trap can be controlled simply by raising or lowering.

The preservation of the bait gave rise to many difficulties in the past. As has been said, Walsh laid his on the earth at the bottom of the simpler traps he employed. When he examined the latter he removed them bodily and replaced them by fresh ones. He does not mention his experiences in emptying them, but if they were at all like my own, which I can well imagine they were, he must have had a great deal of trouble in sorting out his captures from the malodorous mass of carrion and soil. I tried a number of ways of protecting the bait, none of which was useful, before striking along more successful lines. The metal tripod on which the bait rested has already been mentioned ; this served its purpose to a certain extent, but so soon as the bait liquefied it slipped off and on to the floor of the trap, and it was from out of this disgusting mess that specimens had to be hauled. The fact that carrion is left quite exposed and unprotected in either of these ways naturally means that the katabolic processes are hastened, both by soil bacteria and the excretory ferments poured upon it by the dipterous larvæ which so soon develop. Of the types of bait used raw lung tissues (lights) were always found to be eminently satisfactory and far better than raw or cooked meats, animal fat, or pieces of poultry. The former, it is admitted, if left exposed putresces far more rapidly than do the others, which soon become desiccated, and a means of keeping it for longer periods while not detracting from its value required consideration. Liquescent bait made insect removal most unsavoury, and when it was shrivelled, in

taking it away for examination the possibility of the escape of specimens arose. Wrapping up the bait in a piece of netting was tried. This had the effect of keeping it over far longer intervals and its removal was, of course, a much easier matter. The larger necrophagous beetle, nevertheless, did not hesitate to bore tunnels through the bag—*Pterostichus madidus* was a great offender in this respect !—and the bait had to be carefully unwrapped every time so that the insects might be removed ; there was also the recurring likelihood of overlooking species which might have wormed their way deep down into the carrion. Every tunnelling and opening had to be carefully probed and explored with forceps and the unwilling occupant brought forth.

Finally, a glass container which would resist the attack of, at any rate, the larger coleoptera, if not the diptera, was chosen. The idea of a metal receptacle was set aside in favour of a glass one principally because the latter was free from corrosion and because its contents were readily observable. This smaller jar within the large aquarium had its mouth closed with some gauze at first, for it was hoped that the netting would be a sufficient deterrent against any insects which might wish to make a closer acquaintance with the bait it enclosed. In this I was mistaken. The diptera without hesitation settled on the cover and laid their eggs through the network, and the resulting larvæ lived in the carefully prepared larder ! Beetles which had fallen into the trap were unable, however, to scale the smooth sides of the bait jar, but quite a number of the smaller species, notably *Proteinus ovalis* and *Catops fuliginosus*, succeeded in alighting on the netting, through which they found their way without much trouble on account of their size. On one or two occasions the heavy *Necrophori* managed to accomplish this, too, thereby completely spoiling the netting, which had to be replaced. So, to prevent these undesirable entries, it was once more necessary to scheme against these marauders. Finally, a circular disc of perforated zinc was fitted to the carrion jar lip ; the holes were too small to admit any but the smallest of the Staphylinidæ, and as an additional precaution the disc was covered with more netting. This shewed itself to be the best medium, but one wonders whether an insect's ingenuity will not succeed in overcoming even such an obstacle in time. So far as these experiments were concerned that was not the case, and save for some isolated dipterous maggots the bait jars consequently kept in good condition.

Though the bait was completely enclosed except at the top this did not signify that its attractive powers were in any way sensibly reduced ; exposure through the gauze permitted the admission of decomposing agents ; putrefaction went on at a steady rate, and the odour, of such vital importance, was

not suppressed. Indeed, the system had another merit in that frequent changes of bait were no longer necessary, and the identical bait was often used over a protracted period of time. This, however, does not presuppose that the bait should be used till its worth becomes nil ; a regular change of fresh lights, especially during the summer months when decomposition is at its highest, is certainly advisable. Comment upon Walsh's bait enclosure in his funnel trap is withheld. It is a very sound scheme, for it is so easily removed, and all that need be said here is that I found it safer to keep insect and carrion as distinct as I could.

A great deal has been said about the bait, the principal factor for the successful maintenance of a necrophagous trap, but for those investigators who wish to study life histories the above method of keeping the bait would not be suitable, since it is essential that the insect under control has access to the carrion. In the event of an experiment dealing purely with coleopterous metamorphoses, carrion must needs be left in as exposed a condition as possible ; in other words, it should be placed upon the floor of the container itself and left undisturbed. Nor is this all. For pupation the larva may require a varying depth of soil, so that it becomes necessary to fill the floor of the trap with a reasonable layer of soil or clean sand in order to accommodate it. For such experiments receptacles similar to those described would hardly be suitable, and the erection of a special chamber, through which the complete life-cycle may be studied, is advocated. This is best made from two glass plates slotted into a wooden frame narrow enough to prevent a larva's complete disappearance from view. Such a rearing-case is then filled with soil (or sand) on which the carrion is laid. It must be kept constantly moist, and a loose glass slide on top will help to prevent evaporation.

Having prepared traps in the manner described, a suitable locality for their interment was sought. This depended upon which section of the necrophagous coleoptera it was proposed to study. The horticolous necrophaga were chosen, for there were ample cultivated gardens at one's disposal, and accordingly the traps were buried in one of the gardens at Pannal Ash College. This had a southern aspect and contained shrubs of various kinds and herbaceous borders. The rear of the garden was protected by the main block of the buildings, to the east there was a waist-high stone wall, while on the western side a projecting wing offered shelter from the prevalent westerly gales. Thus there was a splendid safeguard from gusty weather and an optimum of temperature. Holes were dug in the flower beds bordering the lawn, one on the eastern and the other on the western side ; a distance of some thirty yards separated the two traps. The holes were just deep

enough to take the trap jars, which were lowered in so that the lip rested flush with the surface. Crevices were then carefully filled in and the earth was stamped and patted down firmly round each trap in order to make an even surface; this prevented insects from falling through gaps between the trap and the hole in which it rested. Once the traps were buried large stones were placed at a little distance from the mouth and on these were rested slabs of plate glass, covered with earth to exclude the light. The stones, of course, ensured that a space was left between the trap and the cover, so that the ingress of insects was always easy. This means of protection was later, as has been explained, replaced by a special conical lid. No earth was placed at the bottom of the jars for it was not intended to remove them once they were embedded. On the contrary the inside was always kept scrupulously clean and free from dirt, thus preventing the smaller species from obtaining a hiding-place of any description. To examine the traps all one had to do was to remove the lid, take out the bait jar, and collect the insects at the bottom. The underside of the bait jar was always gently scraped over the mouth of the trap before it was taken completely out, and the bait, too, was minutely examined and any possible intruders captured.

At the beginning of the third year of investigation, on the advice of Dr. F. J. Killington, with whom I was for some time in communication on the subject, a control trap was set in close proximity to each bait trap. This consisted simply of an empty aquarium jar similar in shape to the others and covered in the same way. The use of such controls ruled out such an obvious criticism as, for instance, that many of the captures were due to an accidental falling into the trap or a desire to seek shelter there irrespective of the bait attraction factor. The conclusions arrived at will be discussed in their place.

The traps were not visited at precisely regular intervals, although whenever it could be this was done, and a periodic investigation of the trap contents rather than an intermittent one is recommended. During the summer months, when a great number of species frequents the traps, examination on consecutive days is most advisable, for the close quarters lead to the larger specimens—particularly the Carabidæ—indulging in cannibalism. In the event of warfare it is necessary to remove the carapace fragments and to put them together again so that records of the numbers remain accurate.

Difficulty was encountered, especially during the warm months, with diptera. They were attracted with almost greater facility than were the carrion beetles, and their egg-laying propensities were a problem which gave rise to great annoyance. On several occasions both traps were found to be swarming with maggots, over and under which coleoptera

scurried, and their expeditious removal was the first concern ; this, as may be imagined, took a great deal of care, for beetles were not averse to remain clutching a maggot when the latter was lifted out, and, in fact, a few specimens were lost in this way. Quite apart from such unwelcome guests and distinct from the putrescent smell emanating from the bait, these dipterous larvæ have a foetid odour quite their own, upon the unpleasantness of which it is unnecessary to dwell. Arthropods generally, however, gave but little cause for complaint, and the secondary records which were kept of them were curiously meagre. Apart from frequent hordes of fly grubs, a number of woodlice, mites, spiders, centipedes, flies of several kinds, micro-hymenoptera and moths were taken, but their numbers never warranted cause for alarm.

Perhaps in view of its more shaded position the western trap was always a little damper than the other, which received more sunshine. This was not regarded as a disadvantage, since for many months it held the ascendancy in numbers over the latter. Only once was it swamped with half an inch of water, and this was due to the fact that the lid had been carelessly replaced. At any rate, after drying it thoroughly and refixing the lid it remained thereafter as dry as its companions. If one refers to Walsh's data, it will be noticed that he had similar experiences more than once, and this is a reason for pressing forward strongly the setting up of a watertight cover against which not even the heaviest of rain or snowfalls can prevail. And here one might add that during the cold months conditions were at times abominable. On one occasion in 1937 during the autumn the western trap was inadvertently broken by a gardener while digging, and the records for that trap that week were consequently spoilt. It was obvious from the first that climatic conditions were bound to affect the movements of carrion coleoptera, and a strict watch upon the moods of the weather was kept throughout the years of research. These influences will be discussed in their appropriate place.

In order to keep the analyses which follow within reasonable bounds, the years have been divided into their respective calendar months. The contents of both traps are taken as one, and no record is published here of the number of times upon which each trap was visited during any particular month or of the captures made upon such occasions. The figures as such are too small to be worth sub-dividing into anything less than months. The control trap figures and captures are dealt with separately.

(*To be continued*)

REVIEWS AND BOOK NOTICES

The Course of Evolution, by **J. C. Willis,** pp. viii×207, with 10 figures. Cambridge University Press, 12/6. The old Darwinian concept of the mechanism of evolution has been for a long time subject to an increasing severity of criticism, and as a working theory is now largely moribund. Increased knowledge of the nature of variation and the workings of inheritance slowly undermined the ground on which Darwin built, and now the theory of natural selection comes in for some rough treatment at the hands of Dr. Willis. The author vigorously attacks the supposed adaptational vaues of differentiating structural characters and he is surely right in his conclusion that the vast bulk of the structural characters which distinguish one plant from another are of no adaptational value whatever. That being the case, they offer no basis on which natural selection could work, and though its potency as a biological force is not denied it is concluded that natural selection plays a far less important part in evolution than that usually assigned to it. Dr. Willis contends that the theory of natural selection has been trying to work evolution in a backward direction in that it supposes evolution to have proceeded in an upward direction from variety to species, from species to genus, and from genus to family. But the higher the grade the less evident are the adaptational advantages of the differentiating characters which should on theoretical grounds become more accentuated, whilst no transitional forms exist in either living or extinct types between such well-marked and taxonomically important characters as leaves opposite or alternate, and thus opening by slits or by pores, fruit types and embryo with one cotyledon, or with two. Species, genera, tribes and families are so habitually separated by such well-marked divergent characters which allow of no transitional or intermediate condition upon which natural selection might conceivably operate that their origin is attributed to definite single mutations. Dr. Willis, therefore champions the view that evolution has moved in the opposite direction from family through tribe and genus to species. This view originally conceived by Geoffrey St. Hilaire a century ago was being pushed by the zoologists, Owen and Mivart, at the time of Darwin's publication of *The Origin of Species,* and early in the present century it was reverted to by Dr. Guppy in what he styled the theory of Differentiation. Dr. Willis' work has led him independently to the same conclusions. The essence of this viewpoint, by which evolution is regarded as a discontinuous process as against the continuous and gradual process required by natural selection, is that ' Mutation tends to be divergent, especially in the early stages of a family. The family, consisting probably of one genus and one species, is probably first created by a single mutation, whilst later ones are usually less marked than the first and give rise to further genera and species. The earliest mutations ultimately give rise to the chief divisions of the family. The Linnean species is not necessarily a conglomeration of forms made from below upwards, but is rather a stage on the way downwards to the Gordanian species. Varieties are the last stages in the mutations and are not as a rule incipient species.' This theory of differentiation or divergent mutation leads to the conclusion that evolution is not a matter of the selection of chance variations, but rather the expression of some definite law not yet comprehended. The first half of the book contains chapters on endemism, mutation, adaptation, isolation, differentiation and divergent variation ; some of these much-discussed topics being viewed from a somewhat new point of view. The second half is devoted to a consideration of 34 test-cases between the rival theories, embracing numerical, morphological, taxonomic and distributional problems. In these many difficulties which formed most serious stumbling blocks to natural selection are satisfactorily resolved, and the principles laid down in the author's *Age and Area* find a ready explanation. Though some of the conclusions arrived at in this book are ' subversive of current opinion '

and will doubtless meet with strong opposition, yet this is clearly a contribution of first-rate importance to biological thought. Whether the theory of differentiation be accepted or not, there remains a mass of data presented in support of the author's ideas for which his critics will have to find some alternative explanation, for only the most incorrigibly conservative could fail to admit that his interpretations are a good deal nearer the mark than the traditional arguments based on natural selection. After reading Dr. Willis's book it is difficult to escape the conviction that, when the dust of controversy has subsided, this work will be accepted as a contribution of outstanding and permanent value to the study of evolution.—W. A. S.

Recent Hull Museum Publications.—Archæological and antiquarian papers of outstanding interest are included among the Hull Museum Publications, Nos. 207-211, recently received. *Yorkshire Neolithic Implements* (No. 211), by Mr. T. Sheppard, M.Sc., A.L.S., records the valuable and important Featherstone collection of prehistoric objects from N.E. Yorkshire, and particularly from the moors near Farndale, which has recently been acquired by the Museum of Archæology at Hull. The collection includes three bronze axes, a series of stone axes and a large number of barbed and lanceolate arrow points, spear heads, knives, spindle whorls and jet pins and beads. This well-illustrated pamphlet is of particular interest to members of the Yorkshire Naturalists' Union in view of the proposed excursion to Hartoft, in the area from which some of the flints were obtained. *Excavations at Elmswell, East Yorkshire*, 1938 (No. 207), by Mr. Phillip Corder, M.A., F.S.A., records, from two miles west of Driffield, the site of ' an insignicant Iron Age village inhabited apparently without interruption from about the middle of the first century A.D. until at least A.D. 500.' A kiln for the drying of corn, underground pits for its storage (apparently the first discovered in the North of England) and a very large number of hand querns for grinding indicate that then, as now, the Wolds was of outstanding importance as a corn producing region. Masses of iron slag indicate iron working at some unknown date, though the source of the ironstone presents a puzzling geological problem. In *A Panel of Celtic Ornament from Elmswell, East Yorkshire* (No. 209) Messrs. P. Corder and C. F. C. Hawkes describe a thin sheet of finely embossed bronze from the same site, which once decorated a wooden casket. The development of this art is discussed in some detail. Both these papers are well illustrated with photographs and diagrams. *Saxon Relics from Barton, Lincolnshire, and from Elloughton, East Yorkshire* (No. 208), by Mr. Sheppard, is already familiar to readers of *The Naturalist* and will need no further recommendation. *Early Tramcars and Records of Additions* (No. 210), by Mr. Sheppard, includes an illustrated description of the reconstructed old-time street preserved in a warehouse at Hull. Mr. Sheppard must again be complimented on his selection of these papers for inclusion in the now extensive list of Hull Museum Publications, and in so doing, making available to the public records of original work in the county which would otherwise, for the most part, lie hidden in specialised journals.—J.E.H.

The Entomologist's Monthly Magazine for January contains ' Some Rare Hymenoptera Aculeata with Two Species New to Britain,' by I. H. H. Yarrow and K. M. Guichard (*Andrena floricola* Bucks. ; *Lindenius armatus*, Hampstead Heath) ; ' Two Coleoptera New to Science in Britain,' by C. E. Tottenham (*Phædon regnianum*, Bosham and Leigh-on-Sea ; *Apion lacertense*, The Lizard) ; ' A New Genus of Dermestidæ (Col.) from New Zealand,' by K. G. Blair ; *Pristiphora retusa* (C. G. Thomson), a new British Sawfly (Hym. Symphyta),' by R. B. Benson (Aviemore) ; ' Notes on British Fungus Gnats (Dipt. Mycetophilidæ),' by F. W. Edwards, and several shorter notes.

The Naturalist

FUNGI AT AUSTWICK

CHRIS. A. CHEETHAM

At the close of the Fungus Foray at Grass Woods on September 19th, Mr. W. G. Bramley made a short visit to Austwick, and the Austwick Field Club organised a local Fungus Foray under his leadership. He has kindly supplied the following list of species gathered on this occasion. This list of species found in September can be examined with the list on p. 211, *The Naturalist*, 1940, of species gathered in early spring (May 11th-13th). Another useful list of fungi found in this area may be seen in the report of the Ingleton Fungus Foray held in September, 1934, and published in *The Naturalist* for that year on p. 256.

For the specialised group, the Mycetozoa, there is an important article by the late A. R. Sanderson, F.L.S. on pp. 62-65, *The Naturalist*, 1918, where a list of 62 species is given with interesting data on their distribution.

List of Fungi gathered at Austwick
September 20th-21st, 1940.

O.=Oxember, Feizor, and Wharfe Woods.
C.=Small beck on opposite side of road to Cave Hole Wood.

Myxomycetes

Trichia varia, C.
Perichæna corticalis, C.

Phycomycetes

Plasmopara pusilla on *Geranium pratense*, O.
Peronospora valeriana on *V. officinale* C.

Ascomycetes

Geoglossum glabrum (=*ophioglossoides*), O.
Belonidium pruinosum, O.C.
Nectria coccinea, C.
Coroyceps militaris, O.
Lasiosphæria hirsuta, C.
Melanomma pulvis-pyrius, C.
Valsa sp. on *Betula*, O.
Diaporthe eres on *Corylus*, O.
Melanconis stilbostoma, O.
Diatrype disciformis, C.
Diatrypella quercina, C.
Hypoxylon multiforme, O.
Coryne sarcoides, C.
Dialonectria sanguinea, C.
Rosellima aquila, C.
Chætosphæria phœostroma, C.
Nitschkia tristis, C.
Anthostoma turgioum, C.
Eutypa flavo-virens (Fr.) Tul., C.
Diatrype stigma, O.C.
Quaternaria quaternata, C.
Hypoxylon coccineu, C.
Xylaria hypoxylon, O.C.

Basidiomycetes

Urocystis anemones on *Ranunculus repens*, C.
Uromyces geranii, II, III, on *G. pratense*, O.
Puccinia acetosæ, II, on *Rumex acetosa*, O.
P. baryi, II, on *Bracypodium*, C.
Amanita rubesens, O.
Amanitopsis vaginata, O.
Lepiota procera, O.
Lepiota amianthina, O.
Amanita muscaria, O.
Armillaria mellea, O.C.

1 Mar. 1941

BASIDIOMYCEES—*continued.*

Tricholoma fulvum, O. (det. A. A. Pearson).
T. album, O. (det. A. A. Pearson).
T. saponaceum var. *squamosum*, O. (det. Miss Wakefield, Kew).
Russula nigricans, O.
R. ochroleuca, O.C.
R. cyanoxantha, O.
R. fragilis, O.
Mycena galericulata, O.C.
M. galopus, O.C.
Colybia butyracea, O.
Lactarius torminosus, O.
L. turpis, O.
L. pyrogallus, O. (det. A. A. Pearson).
L. quietus, O.
L. glyciosmus, O. (det. A. A. Pearson).
L. subdulcis, O.
Hygrophorus eburneus, O.
H. pratensis, O.
H. virgineus, O.
H. niveus, O.
H. laetus, O. (det. A. A. Pearson).
H. ceraceus, O.
H. coccineus, O.
H. miniatus, O.
H. puniceus, O.
H. conicus, O.
H. calyptræ formis, O.
H. psittacinus, O.
H. unguinosus, O.
Laccaria laccata, O.
Panus torulosus, C.
Pluteus cervinus, O.
Entoloma porphyrophæum, O.
E. clypeatum, O.
Leptonia flampropus, O. (certe A. A. Pearson).
Clitopilus prunulus, O.
Pholiota mutabilis, O.
Inocybe descissa var. *auricoma* (Batch.) Fr., not in catalogue, O. (det. A. A. Pearson).
Hebeloma crustilineforme, O.
Galera tenera, C.
G. hypnorum, O.C.
Tubaria furfuracea, C.
Cortinarius (*Myx*) *elatior*, O. (det. A. A. Pearson).
C. (*Myx*) *delibutus*, O.
C. (*Dermo*) *cinnamoneus*, O. (det. A. A. Pearson).
C. (*Tela*) *brunneus*, O.
Psalliota campestris, O.
Stropharia æruginosa, O.
S. merparia, O.
S. semiglobata, O.C.
Anrllaria separata, O.
Hypoloma fasiculare, O.C.
H. lacrymabundum, O. (det. Miss Wakefield).
Paneolus campanulatus, O.
P. papilionaceus, O.
Psathyrella disseminata, C.
Coprinus radians, C.
C. plicatilis, O.C.
Cantharellus cibarius, O.
Paxillus involutus, O.
Tylopilus felleus, O.
Boletus chrysenteron, O.
B. scaber, O.
Polystictus versicolor, O.C.
Irpex obliquus, C.
Trametes mollis, C.
Merulusi corium, C.
Mycoleptodon ochraceum, C. (det. Miss Wakefield).
Stereum rugosum, C.
S. hirsutum, C.
S. purpureum, C.
Corticeum laeve, O.C.
C. confluens, C.
Clavaria fusiformis, O.
C. corniculata var. *pratensis*, O.
Auricularia auricula-judæ, O.
Dhcryomyces deliquescens, O.C.
Calocera stricta, O.C.
Phallus impudicus, O.
Lycoperdon nigrescens, O. (not in catalogue).
L. pyriforme var. *excipuliforme*, O.

FUNTI IMPERFECTI

Colletotrichum liliacearum (West.) Duke. This forms small black spots on old flowering stalks of Bluebell. Is not listed in Catalogue, but occurs nearly everywhere that Bluebell does.

IL, 1941 No. 789

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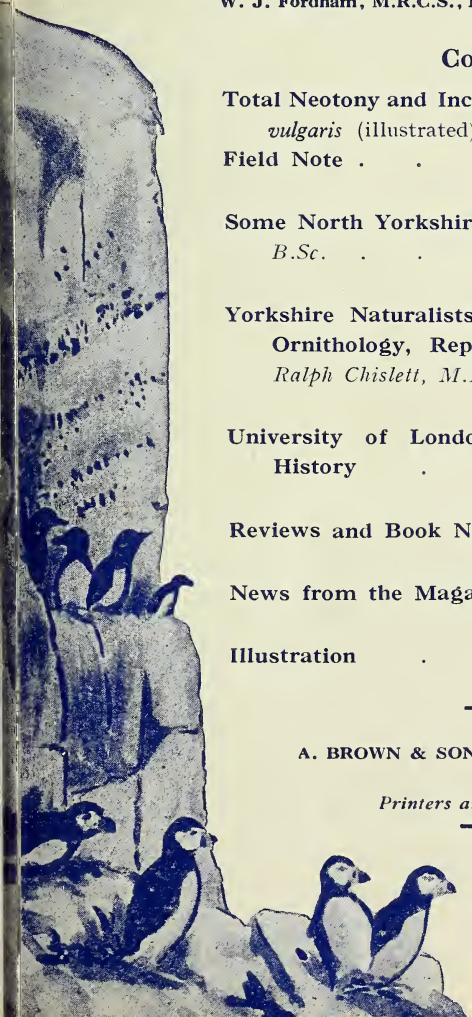

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TOTAL NEOTONY AND INCOMPLETE ALBINISM IN *MOLGE VULGARIS*

REX PROCTER

On November 19th, 1940, Mr. J. Digby Firth brought to me an amphibian which had been in his possession throughout the year. I identified it as a male Smooth Newt (*Molge vulgaris* Linn) in a state of total neotony.

I was informed by Mr. Firth that it had been taken in a pond at Meanwood early in the spring by some boys, who were

impressed by its unusual appearance and brought it to him. The pond is a shallow one and was frozen solid the previous winter. Mr. Firth informed me that during the period under which he had maintained his observations the newt had remained generally inactive. It had not fed readily except on one occasion when Mr. Firth introduced some weed containing red blood worms into its tank, when it fed voraciously.

When Mr. Firth brought it to me in November it was perfectly healthy, although very inactive. The dimensions at this time were : total length, 61 mm. ; length of tail from hind legs, 32 mm. ; depth of tail, 8 mm. ; breadth of belly, 9 mm. ; weight, 1·65 gms. It will thus be noted that in spite of its restricted diet and lack of activity it was quite well developed and plump, although rather under average in size, the average length of mature males being about 70-80 mm. In colour it was a very light creamy white. The iris of the eye was golden yellow and free from black flecks, but with a band of black pigment crossing it.

The tail fin was mainly below the axis, the slender bordering above merging into the body before reaching the neck region.

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It was principally upon this that I based my identification of sex, since no examination was made of its organs.

The external branchiae were strong and well developed with sturdy bases and feathery fine termini, and showed no signs of absorption.

Mr. T. Kerr, of Leeds University, took the newt to the Department of Zoology, where he continued the observations. It was kept in a tank with two larvæ of the Great Crested Newt (*M. cristata*) with whom it lived quite amicably. It was quiescent in its habits until aroused, but then became very active. It would snap at large daphnia released in the tank, though not take them, but would eat enchytræid worms and insect larvæ readily and finally would eat pieces of chopped earthworm.

The two *cristata* larvæ metamorphosed successfully before reaching the size of the *vulgaris*. Early in December this newt commenced to show signs of attempted metamorphosis, and the absorption of the branchiæ commenced, but on December 17th, 1940, it died.

It would, I think, in reference to the coloration be correct to describe it as an incomplete albino. In the amphibians all stages of the reduction of both eye and body pigment occur, and particularly this pigmented eye and non-pigmented body condition. Since all stages of depigmentation occur it seems unnecessary to suppose that more than one process is involved. The indications of yellow about the body would seem to indicate that the xanthophore cells were normal.

Neotony was described by Kollman in 1882. Many of the amphibians have the power of retarding metamorphosis and of retaining the larval characters beyond the normal period. Kollman distinguished two types :

(1) Partial neotony, to describe the simple retardation of metamorphosis beyond the normal period (for instance, the wintering of tadpoles).

(2) Total neotony to describe the condition where the amphibian retains its gills and other larvel characteristics, but becomes sexually mature.

Partial neotony may occur in both the Anura and Urodela, but total neotony occurs only in the Urodela. There are records of partial and total neotony for all the British newts, and Mr. H. B. Booth recorded total neotony in *M. palmata* at Ilkley in 1921 (Minutes, Mammals, Reptiles, Amphibians and Fishes Committee).

I do not know of a completely satisfactory explanation of neotony, although there are several theories. It may, however, be significant that it often occurs after continued extreme cold or similarly unfavourable climatic conditions. It is possible

also that conditions forcing abnormal and prolonged use of the gills and tail may stimulate the growth of these organs at the expense of other organs intended for terrestrial life, since often, as in the present case, a newt in a condition of total neotony has well-developed external branchiæ accompanied by a well-developed tail and tail fins. Whatever the cause, it is obvious that each individual is differently affected by similar environment, since it is possible to rear in the same high glass walled vessel under identical conditions and from the same spawning, newts in every stage of development from total neotony to completed metamorphosis. The Anura react similarly, and in the very cold winter of 1939-40 a single batch of frog spawn (*R. temporaria*) I had under observation in a glass tank in a greenhouse produced fully metamorphosed adults and every intermediate stage to tadpoles in which no attempt at metamorphosis appeared after eleven months, when the tadpoles died.

It is of interest that where total neotony occurs in newts it is much more common in females than in males. While it is not uncommon for females in a condition of total neotony to produce ripe eggs, it is almost unknown for a male in similar condition to produce active spermatozoa.

I am very grateful to Mr. Firth for the specimen, to Mr. Kerr for his observations and suggestions, particularly regarding the pigmentation deficiencies, and to Mr. Manby for the photograph, which is the property of the Department of Zoology of the University of Leeds.

FIELD NOTE

Tenthredo (or Allantus) arcuata, etc., in Yorkshire.—*Tenthredo arcuata* Forst. has been regarded as one of the commonest and most variable of our Sawflies. Recently, however, R. B. Benson (*E.M.M.*, 1940, p. 231) has clearly differentiated three closely allied species which have been confused under this name. On re-examining my collection, I find examples of each of these allied species among material which I have taken in Yorkshire as follows : *T. arcuata* Forst. (Ravenscar, 23/6/37, 6/7/37, Ramsdale, 2/7/39, Fylinghall, 31/5/40 (all in the Robin Hood's Bay district), V.C.62—this is an early species occurring from April to about the end of June) ; *T. perkinsi* Morice. (Bridlington, 3/8/21, V.C. 61 ; Ramsdale, 27/7/39, 24/7/40, V.C.62 ; Sprotborough, 2/8/37, V.C. 63—a later species occurring from July till October) ; *T. sulphuripes* Kriechb. Thorpe (Robin Hood's Bay), 15/6/38, V.C.62 ; Sprotborough, 2/8/37, V.C. 63—also a later species, from June till October).—James M. Brown.

1 April 1941

SOME NORTH YORKSHIRE BUTTERFLIES

G. B. WALSH, B.Sc.

Pupæ of the Large White Butterfly (*Pieris brassicæ*) were common in the Scarborough district during the winter of 1939-40. Owing to the long winter and the sudden coming of warm weather there was a large emergence of the butterflies in early May and fine weather favoured pairing and oviposition. There was thus a very strong emergence of the second brood in August. This was added to by a large immigration from the Continent. Mrs. Greaves reported seeing great numbers flying up the Valley from the sea for three or four days during the middle of the month, and swarms of them were to be seen all over the countryside. Warned by notices on the wireless and in the newspapers, most gardeners killed the eggs and young larvæ before they did much damage, but in some gardens they occurred in enormous numbers and ate up many of the cabbages, etc. In one place I saw them by thousands, but on the walls, etc., in the neighbourhood not a single pupa is now to be seen. Large numbers were killed by passers-by, many died from some sort of diarrhoea, and the rest were parasitised by *Apanteles glomeratus*. The Small White Butterfly (*P. rapæ*) occurred in fairly normal numbers throughout the year.

In 1937, at a meeting of the Scarborough Field Naturalists' Society, Mr. A. Spring reported seeing a specimen of the Comma Butterfly (*Polygonia c-album*) in the neighbourhood. This was not recorded because it was thought that it might perhaps have been an escape from Mr. Head's butterfly farm at Burniston, though Mr. Head thought this unlikely. In 1940 Mr. G. B. Horsman reported a second specimen in Peasholm Glen, and as Mr. Head did not breed the species during that year, we now put on record its reappearance in this district after many years of absence. As lepidopterists know, it is recolonising some of its lost range in the South of England.

The Peacock butterfly (*Nymphalis Io*) has also been seen on several occasions during the year, as during several preceding years.

The writer found larvæ of the White-letter Hairstreak (*Strymon w-album*) in 1940 in wych elm in Kirkdale. It seems to be fairly widely distributed in the moorland valleys running down to the Vale of Pickering.

The Entomologist's Record for January contains 'A Matter of Light,' by an old moth hunter ; ' The reputed hybrid *Nyssia zonaria* Schiff ♂ × *Apocheima hispidaria* Schiff ♀' by E. A. Cockayne ; ' The Summer Flight in Cold Climates of Vernal and Autumnal Lepidoptera,' by E. P. Wiltshire ; ' Larval Habitats of Apatura iris,' by A. E. Wightman ; ' On the occurrence of Northern and Southern Species of Carabidæ in a section of the Weald,' by B. A. Crowson ; Collecting Notes ; Current Notes, and Supplement, ' The British Noctuæ and their Varieties,' by H. J. Turner.

YORKSHIRE NATURALISTS' UNION: COMMITTEE FOR ORNITHOLOGY

REPORT FOR 1940

Chairman : R. M. Garnett.

Recorders :

H. B. Booth, F.Z.S., M.B.O.U. (West Riding) ; W. J. Clarke, F.Z.S. (North Riding) ; C. W. Mason (East Riding) ; E. W. Taylor (York District).

Edited by RALPH CHISLETT, M.B.O.U.

The establishment of a Committee devoted to ornithology in the Y.N.U. is a new fact for 1940. Interest in the subject in the Union is as old as the Union ; and the Annual Reports have testified to the volume of valuable work that has been done in the past by members who have passed away ; and also for long years by many members who happily are still with us. Reasons for the change of date of our ornithological year end to December 31st were advanced in the General Report of the Union, published in *The Naturalist* for January. The issue of a separate Ornithological Report will, I feel, be a gain to the Union, as well as to this Committee. The kindly tolerance of the members of the many other sections represented on the Executive and General Committee of the Union, which enabled the change to be made without hitch, is gratefully acknowledged.

It has been suggested to me that this report should be prefaced by a brief note indicative of the principles that should be followed by our official recorders, and by the much larger number of field workers who supply them with notes from their own individual records. Broadly I think our objective should be to see that our Reports contain particulars of any changes affecting Yorkshire birds as they occur ; changes in status, in distribution, in habits of all kinds, with their causes ; as well as notes of unusual occurrences in our districts, and all facts bearing upon migrational problems. Everything that is Yorkshire ornithological news should be recorded. The fact that a species already well known to occur in a district in fair numbers has done so again is not news ; but a change in status of that species should be noted, with notes evidential and of possible causes. It is important to keep track of our rarities, and of the species for which we have few breeding places. Notes of movements of all species may have bearing upon problems of migration, and may link-up with observations made elsewhere, in or outside the county. Dates of arrival of migrants are useful from those who are ' out ' on most days. Those engaged in the study of special problems will derive help concerning their requirements if we are informed about them. In all matters exact data should be supplied, with details of the available evidence, and reasons upon which records are based. And I think that covers the matter.

The special circumstances of 1940 affecting this report apply to the whole county, consequently many of the general observations relating thereto have been brought together. The York Report which appears at the end, coming from the centre of the county, confirms those from the Ridings. Restrictions upon opportunities for field work caused by the war have affected us all in varying degrees. The abnormally severe weather of January and February, which began in late December of 1939, affected birds everywhere in Yorkshire. At Rotherham, during January, the lowest temperature recorded was that of 8 degrees on January 21st ; and during the month only on four days did the minimum exceed 30 degrees (G. Howard, F.R.Met.S.). The ground was hard for the whole of the month. Much snow fell particularly towards the end of the month, and after a half-hearted attempt early in February, the thaw did not

begin in earnest until February 20th. There was no wonder that masses of birds left the county, that hordes of visitors from further north arrived, and that thousands of birds died, including both residents and visitors.

H. B. Booth writes: 'All the ponds, tarns, streams (except the quickest flowing ones), and the River Wharfe, were frozen over; and many outlying villages were completely isolated. No doubt wild birds suffered severely, but as I was suffering from a bad foot, I was unable to get about much. Several dead Song-thrushes and two dead Herons were reported to me. Also two dead Mute Swans on the River Wharfe; and another pair were frozen in the ice near Otley and were released when the ice was broken with poles.

'Mr. J. E. Marson reported to the Bradford Natural History and Microscopical Society, on March 11th, that he had found 182 birds presumably frozen or starved to death near Bradford; they consisted of 46 Blackbirds, 23 Thrushes (some of which may have been Redwings), 48 Starlings, and 65 House Sparrows.'

In the North Riding, W. J. Clarke reports exceptional occurrences of Glaucous Gulls along the coast; and large numbers of wild fowl. 'Up to 360 Scaup Ducks were sheltering at one time in the harbour at Scarborough, being constantly present in varying numbers between February 6th and March 28th. Whitby harbour was similarly invaded by Scaups, among which were a few Tufted Ducks and Goldeneyes (A.S.F.). A single Scaup drake penetrated as far inland as Thornton Dale. Several Shelduck were seen during the severe weather at Scarborough. All the Coots were driven away from the Mere at Scarborough and did not return; but a single pair nested at Throxenby Mere.

'Many of the smaller birds suffered considerably. Thrushes were very scarce afterwards with the single exception of the Blackbird which survived fairly well; but Fieldfares, Redwings, Mistle Thrushes, and Song-thrushes suffered severely. Pied Wagtails, Common Wrens and Goldcrests suffered a reduction in numbers.

'Very large numbers of sea-birds were killed by lack of food. Twenty Black-headed and Common Gulls were laid dead on a small area of the South Sands at Scarborough on February 6th. There were also a few dead Herring Gulls. On February 17th on the sands between the Spa and the harbour were the bodies of 1 Razorbill, 2 Guillemots, 2 Shags, 2 Scaup, 1 Common Scoter, 1 Ring Dove, 1 Redshank, 1 Starling, and 55 mixed gulls including 1 Greater Black-back and many Common and Black-headed. The Razorbill alone showed traces of oil. All the other were extremely emaciated and had clearly died of starvation. A similar state of affairs was reported both north and south of Scarborough at the same time.'

The tale along the coast of the East Riding was similar. Waterfowl congregated on the Humber, many Mallard and Wigeon lying off Hull Pier on January 25th (C.W.M.). Below Goole the Humber was frozen over and people walked across it.

G. H. Ainsworth and J. Lord described their experiences on two days in early February near Bridlington (see *The Naturalist*, p. 135). On March 10th the area was visited again and in half a mile of coast the following dead birds were counted: Bean Goose, Tufted Duck (3), Common Scoter (8), Cormorant (2), Great Crested Grebe (2), Slavonian Grebe (3), Common Gull (7), Herring Gull (2), Black-headed Gull (4), Guillemot (16), Razorbill (5), Puffin (2), Little Auk (4). Further along for 1½ miles only 3 Guillemots, a Puffin, and 4 Razorbills were found. Nearly all birds had oil on them, some very little, others covered completely, but G.H.A. doubts if oil was the cause of death of all the birds, since he picked up some of the Tufted Ducks and Scoters which were still alive, but very emaciated, and had no oil upon them. Probably the majority of the oiled birds had been covered after death by oil washed

up afterwards. On March 24th a Whooper Swan was picked up by a local resident and cooked, although it proved to be mainly skin and bone. (G.H.A. was shown the head.)

On March 23rd a further visit was paid and the following species added to the list : Velvet Scoter, Kittiwake (2), Black-necked Grebe (1), Brent Goose, and another Whooper Swan. All these birds were covered with oil, a diver being too black with it for specific identification in the field. Local inhabitants were filling sacks with washed-up shell-fish for use as bait and the fishermen say such generally occurs after very cold weather.

Of the wastage of bird life along the Yorkshire coast the above only records a very small fraction. The Tufted Duck put up from the gutter in a Reighton village street by T. Hyde-Parker was an interesting instance of the straits to which even hardy birds became reduced.

Birds Found Dead.

The time for the request for birds found dead to be sent to A. Hazelwood could hardly have been more opportune. During the cold spell 80 birds were sent. The species covered were as follows : Rook, Jackdaw, Greenfinch (11), Chaffinch (6), Brambling (2), Yellowhammer (4), Great Tit (8), Blue Tit (5), Pied Wagtail, Great Grey Shrike (Pickering, R.M.G.), 3 Song-thrushes (R.M.G., 1), Blackbird (17), Redwing, Mistle Thrush (2), Robin (4), 2 Wrens (R.M.G., 1), Starling (4), Northern Guillemot (G.H.A.), Little Auk (Bridlington, G.H.A.), Slavonian Grebe (Bridlington, G.H.A.), Red-necked Grebe (Pickering, R.M.G.), Common Scoter (Bridlington, G.H.A.). The species against which no initials appear were all sent from the Aberford district, having been gathered by W. Pickles and his boys. One wishes that members in other districts could have responded as thoroughly. Eight species are reported on below in detail.

The numbers of dead birds seen can be only a fraction of those not seen, and the numbers in the above list can hardly be taken as generally indicative of the comparative extent to which species suffered in other than the Aberford district. Blackbirds from Aberford numbered 17 and Song-thrushes only 2, but to judge by the subsequent prevalence of the two species in many districts, a reversal of the figures elsewhere might be not unexpected. In no case had a Blackbird died from starvation, cold or thirst are suggested as possible causes. In the York District, E. W. Taylor writes : ' It was most noticeable that the Blackbird proved much hardier than either the Redwing or Song-thrush. ' The numbers of the latter were much reduced until the nesting birds arrived from further south in mid-March, and the depleted stock that had wintered in this area moved further north.' In my own district of South Yorkshire a fair proportion of garden birds survived ; but most of the woods were strangely silent in April, although filling up to some extent in May.

The Greenfinch figures next most numerously, but in many Yorkshire districts breeding Greenfinches were normal in numbers in 1940. Only 2 Wrens figure in the above list, but the species suffered so heavily as to be almost exterminated in some areas. Yorkshire observers in all parts agree that Wrens were scarce in 1940 ; but R. Procter has reported three Wrens in his garden near Wetherby. The Waterhen is not included in the list, but it vanished from the Rotherham district during the frost and only a comparative few returned afterwards ; many a pool was without its usual pair ; and the diminution in number of breeding Waterhens in the Hatfield district, where normally the bird is exceedingly common, was most marked. In the East Riding, however, and in some other parts, no such reduction in the breeding population of Waterhens could be noticed.

In asking for dead birds to be sent to him, Mr. Hazelwood was actuated mainly by the desire to throw light upon the continental and other racial

forms that visit Yorkshire. This attempt to take advantage of specimens provided by the casualties of nature for scientific purposes is worthy of full support ; and its practical utility is well demonstrated by the following :

Continental Races in Yorkshire.
(Report by A. Hazelwood)

Chaffinch.—One or two received on February 5th from Aberford agrees with the Continental, or typical, race. One other bird seemed to be of this race but was in too bad a state to preserve. In view of the large numbers of immigrant and passage birds to be met with on the coast during the autumn it is to be expected that some of our winter birds will prove to be of this race. It is a form difficult if not impossible to recognise with certainty in the field and we must rely upon casualties to assist us to trace the degree of penetration of the race inland.

Great Tit.—All the Great Tits received were of the British race. There is no positive record of the Continental race for Yorkshire though in view of the large numbers apparently immigrant in some years it would seem likely that we have the race in at least some winters.

Blue Tit.—All but one of the five received from Aberford were definitely of the British race. A male received on January 28th has the measurements of the Continental race and seems somewhat paler and brighter than others from the same area. The bird was badly damaged when found and Mr. Witherby regards it as difficult to assign with certainty. On examination of a series I concur with this and find some fully adult British birds approach closely to some of the typical birds. In view of the fact that large immigrations of Blue Tits have been noted in Yorkshire it is highly probable that we shall ultimately be able to add the race to the county list. The specimen referred to above cannot as yet be regarded as conclusive evidence. (*N.B.*—I have myself seen Blue Tits on the coast in autumn that I strongly suspected of being of the Continental race. R.C.)

Great Grey Shrike.—The bird from Kingthorpe, Pickering (R.M.G.) was of the more frequent northern race.

Song-thrush.—A bird from Pickering on January 20th, 1940, sent by R.M.G., bore a ring from Leiden and proved to have been ringed as a nestling at Vogelensang, near Haarlem, Holland, on May 13th, 1939. The Dutch bird is indistinguishable from the British race, and though this specimen is paler on the flanks and throat than most *ericetorum*, Mr. Witherby thinks it can safely be considered of this race. There is no doubt that the Continental bird visits us in the winter but it would be of considerable interest to examine as large a number as possible in order to ascertain whether the majority remain through the winter or are merely on passage.

Redwing.—This bird from Aberford on January 19th had the coloration of the Iceland race. The wing measurement of 119 mm. is the minimum for this race and though I am personally convinced that it is an Iceland bird I prefer to wait for a thoroughly typical one before making a definite record for the race.

Robin.—At least one of the four (from Aberford, January 26th) is of the Continental race. The breast is considerably paler than in the British bird, the upper parts and flanks paler, and the belly shows more white. No doubt there is a fair sprinkling of birds remaining to winter in the county in addition to the annual passage in the autum and spring.

Northern Guillemot.—This bird from Bridlington (February 3rd, G. H. Ainsworth) was definitely of the northern race which breeds only in the extreme north of the British Isles. It would be interesting to ascertain by a count of the many corpses which strew our beaches every winter just what proportion of the birds wintering off the coast

belong to this race. The races are relatively easy to distinguish in the hand.

The collective work exemplified in the scheme for examination of birds found dead could be extended in many directions. Collective observation at Spurn has already yielded good results and under better conditions could go much further. Migrational problems are almost more numerous than species ; and only by collective work can they be adequately attacked. Each of us may see a very small part of a great movement ; and to pool experiences is to get a more complete picture, even if it is still only a slightly larger part. I have long wanted to link some of the interesting records from the reservoirs and sewage farms of the Halifax district with others north and south of that area. Consequently, when I knew that a species (Little Stint) I had seen by a North Derbyshire reservoir on October 6th had also been seen on the same day at Elland Sewage Works, I was much interested. The line from Elland to the Owler Moors runs practically due south ; and it is possible that both birds were a part of the same movement southwards of Dunlins with Stints. Or had they travelled along parallel lines from different parts of the coast ? Much more evidence is needed.

Redwing.—In the November issue of *The Naturalist* I asked for autumnal records of this species and as a result am able to report as follows :

First seen in Thornton Dale on October 3rd, a party of 15 on rowans and several little lots up to October 13th (R.M.G.). On October 15th there were large numbers feeding on rowan berries in the Duddon Valley, Westmorland (C.A.C.). On October 19th, W. F. Fernley reports birds as calling frequently overhead at night by March Ghyll Reservoir, two miles north of Ilkley. On October 20th came the first large flock to Thornton Dale ' with a wind from the east, and low misty clouds that made me wish I was on the coast ; it was a good day for a ' hold-up ' (R.M.G.). On October 20th, near to the Derbyshire-Yorkshire boundary, I disturbed several nesting under braken in the morning ; in the afternoon a flock of 20 flew over me southward ; at night there was much ' seeping ' above, between 7 and 7-30 p.m., moving south (R.C.). At this time (October 21st) in *The Field*, Dugald Macintrye, writing from Comrie, Perthshire, reports ' At mid-afternoon the air was full of Redwings, and every fruit-bearing tree held its complement, immense flocks passed southward.' On October 25th, at Scarborough, R.M.G. saw a small party, but by October 27th, in Thornton Dale, the birds were very numerous. ' It seems they spend the day in the Vale and fly up to roost in Dalby Forest, just before dusk, in hundreds ; and just before sunrise can be seen setting out again for food, many passing south over this house. It is difficult to distinguish migrating birds from those moving locally.' One bird was picked up dead by T. Hyde-Parker, near Reighton, on October 27th. Evidently immigration was spread over most of October, with the main movement just past the middle of the month. Probably the coast was crossed at many places. A relative writes that in January, 1941, Redwings were very numerous in Cornwall near to Falmouth.

Ringed Birds.

If the records of ringed birds recovered in Yorkshire and of birds ringed in Yorkshire and recovered there or elsewhere had been included in the Y.N.U. Reports each year, the task of the seeker after the information regarding bird migration as it affects Yorkshire would have been rendered much easier, and a more active interest in the subject possibly have been stimulated. I have therefore listed the records published in 1940. In the present year I shall be glad to supply rings for species of special interest if members will ask for them as they have opportunities of using such.

Recovered in Yorkshire.

Starling.—A bird found dead at York on December 4th, 1940, bore a ring marked 'Vogelwarte, Rossitten, Germania, F316053 (S. H. Smith).

Song-thrush.—Bird ringed in Holland on May 13th, 1939, recovered near Pickering in January, 1940 (see A. Hazelwood's report).

Teal.—A female killed at Keld Head, Pickering, at the end of January, 1940, had been ringed at Piaam Decoy, Friesland, Holland, on April 24th, 1938 (N.R. Report).

Another ringed as adult, Pembroke, January, 1939, for Wildfowl Enquiry Committee was recovered in Yorkshire in January, 1940 (*British Birds*).

Dunlin.—One found dead at Filey in January, 1940, had been ringed at Jaeren, South Norway, on passage, September 9th, 1939 (N.R. Report).

Black-headed Gull.—A bird ringed as a nestling on June 16th, 1938, on Vorse, a small isle in Horsens Fjord, East Jutland, was recovered in difficulties at Blackburn Sewage Works, near Sheffield, in January, 1940 (R.C.).

Common Gull.—One recovered at Filey in early February, 1940, has been ringed at the Island of Valsoama, West Finland, June 27th, 1937 (N.R. Report).

Gannet.—Ringed as nestling on the Bass Rock, July 28th, 1939, by Bootham School; recovered Withernsea, December, 1939 (*British Birds*).

Ringed in Yorkshire.

Pied Wagtail.—Ringed as young bird at Wetherby, June 1st, 1939, recovered Mazagan, Morocco, February 10th, 1940 (*British Birds*).

Song-thrush.—Ringed at Helmsley as nestling by Bootham School, June 16th, 1939, recovered Glanddulas, Denbigh, January 30th, 1940 (*British Birds*).

Blackbird.—Ringed as nestling at Ingleton, June 10th, 1936, by Messrs. Moon and Cooper; recovered Liscannor, Co. Clare, January 19th, 1940 (*British Birds*).

Blackbird.—Ringed as full grown at Ingleton, June 1st, 1939, by Messrs. Moon and Cooper; recovered Glenluce, Wigtown, February 1st, 1940, (*British Birds*).

Blackbird.—Ringed as full grown at Caperby, October 28th, 1938; recovered at Waterford, January 20th, 1940 (*British Birds*).

Swallow.—Ringed as nestling, Harrogate, August 20th, 1939, by P. Hirst; recovered Valencia, Spain, October 12th, 1939 (*British Birds*).

Kestrel.—Ringed as young, Sedbergh, July 13th, 1939, by Sedbergh School, recovered Welford-on-Avon, Warwick, January 13th, 1940 (*British Birds*).

Lapwing.—Two birds ringed as young at Ribblesdale, May 16th, 1934, and at Clapham, May 13th, 1939, by Messrs. Moon and Cooper; recovered respectively at Carrigaline, Cork, January 22nd, 1940, and at Bantry, Cork, January 20th, 1940 (*British Birds*).

The dates and circumstances of many items in the following lists of records indicate connection with the long, cold spell.

West Riding (H. B. Booth, F.Z.S., M.B.O.U.).—

Rook.—The occupied nests counted by Miss D. H. Clough in the Steeton Hall rookeries (including Shroggs' Wood) numbered 312, or only two less than in 1939, and one less than in 1938; this remarkable stability appears to have been unaffected by the cold weather.

Goldfinch.—The species is reported as occurring in fair numbers in the Wetherby district (R.P.). A pair nested as usual in an old garden at Hatfield (S. E. Evans), in which district the bird breeds in several areas (R.C.).

Snow Bunting.—There were about six birds on Weston Moor, near Otley, on November 1st. The gamekeeper said they had been there for about a week ; rather early for so far inland (F. H. Edmondson).

Skylark.—A flock of about 300 was seen on Errington Moss on January 14th, 1940 (E. Watson).

White Wagtail.—Two were seen at Witherns Reservoir on April 22nd (E. Watson).

Waxwing.—A bird was picked up in Bolton Woods, Wharfedale, in December (Rev. C. F. Tomlinson).

Spotted Flycatcher.—There was the usual nest in a box on the rectory wall at Bolton Abbey. The first egg was laid on May 23rd, the fifth and last on May 27th. The first young hatched on June 8th and the last on June 9th. The five young birds left the nest on June 22nd (Rev. C.F.T.).

Grasshopper Warbler.—A cock bird reeled every evening during the last week in June in the rough herbage and young trees of what was formerly Westy-bank Wood. It was always in the same locality but I failed to find a nest (Rev. C.F.T.). As often happens, in other parts of Yorkshire the bird had probably reeled in other places without finding a mate.

Song-thrush.—The species suffered severely in the cold weather ; and its voice was noticeably weak in the spring chorus. For the first time in 32 years I had not a single nest in my garden.

Blackbird.—On January 27th an almost pure white Blackbird was seen near Nab Wood Cemetery, Bradford (A. Malins Smith).

Wheatear.—Arrived at Austwick on March 20th (C. A. Cheetham), an early date despite the late winter. From the Ilkley district it was not reported until March 28th, at Beamsley (S. Jackson).

House Martin.—'Out of 60 to 70 leaving my house in Huby in 1939, I have only had 14 nests in 1940, most of which were double brooded ' (A. Haigh-Lumby).

Hoopoe.—On April 26th Mr. H. Moore, of Sheffield, and Mrs. J. Carr, of Greenfield, saw a bird at the entrance of the Chew Valley, which at first they took to be a Jay. The bird flew up in front of them and alighted on a wall, where a good view was obtained through field glasses. From the extraordinary crest and the white wing-bars they had no hesitation in pronouncing it to be a Hoopoe.

Lesser Spotted Woodpecker.—A bird was seen and watched at 20 yards range at Wentworth, near Rotherham, in which district the species is rarely seen, on August 26th (C. G. des Forges).

Little Owl.—On January 21st I saw, during deep snow, the first bird actually seen in the village of Ben Rhydding. Although increasing slightly elsewhere, the species makes very little progress in the dales, and is indeed a bird of more level country.

Short-eared Owl.—One seen flying at Ringston Edge Reservoir on September 20th (Halifax Notes).

Tawny Owl.—Three dead Tawny Owls were found in the chimney of a Girl Guides' hut at Thackley, Bradford, on March 9th (S. Jackson).

Heron.—There were five occupied nests in Park House Ghyll (between Gisburn and Bolton-in-Bowland). All were in tall pines, two being in one tree (Misses Steinthall and Maynard).

At Gargrave, on May 1st, there were 24 nests, 21 in oaks and three in larches (W. F. Fearnley). I was unable to visit Harewood Park but Mr. Wilson, the head gamekeeper, informed me there were nine nests in 1940, one of which was robbed by Carrion Crows and was afterwards deserted.

At Hubberholme the spruce wood is being cut from the Hubberholme end and a saw-mill is in action. In spite of this, four pairs of Herons have succeeded in nesting at the top end of the wood ; if the felling continues it will mean the end of the heronry.

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At Healaugh (Shire Oaks Wood) only one of last year's nests remained owing to the weight of snow. That was in an oak tree. This 1940 season the birds have greatly favoured oaks, and have avoided nesting in ash and larch. There were 29 occupied nests, 26 of them in oaks and three in spruces. In 1939, through molestation, only one pair of Herons nested at Moreby, near Stillingfleet. Seven pairs moved across the Ouse and thus into the West Riding, and nested successfully in Stubb Wood, Acaster. They did not nest there in 1940, but six pairs appear to have returned to another site at Moreby, where they nested in a small larch spinney (John Hewitt per S. H. Smith).

Grey Geese.—On December 24th I watched a long, straggling flock of over 100 flying west and fairly low over Denton Park at about 3 p.m. Nine were also seen flying east, near Bradford, on December 25th (J. Bickersdike).

Ducks on Reservoirs, etc.

Shelduck.—On December 10th, on Swillington Ing, there were 8 birds, and 6 birds on December 17th (A. Gilpin). At White Holme Reservoir there were 9 on August 18th and 21st ; 4 on August 27th, September 1st and 8th ; 2 on August 25th and September 3rd. At Fly Flatts Reservoir 1 on September 15th. At High Royd Sewage Works 3 on September 16th. At Ringstone Edge Reservoir 2 on August 18th (H. Notes).

Mallard.—The new reservoir at Stocks-in-Bowland is already proving attractive to ducks. Some 250 to 300 Mallard were present on October 3rd (R.C.).

Gadwall.—Four on Eccup Reservoir on November 4th, 1939 (H. Walker and A. Gilpin).

Garginey.—One at Swillington Ing on May 14th (H. Notes). A pair on Hollin Hall Pond, Harewood, on May 18th (H. Walker).

Wigeon.—During February and early March there were large flocks of ducks, chiefly Wigeon, on the Ribble near Settle. Everyone who had or could borrow a gun was after them (R. B. Sturdy). 26 on Ringston Edge Reservoir on September 29th and 9 on Blackstone Edge Reservoir (H. Notes).

Pintail.—On January 21st, W. F. Fearnley called at my house and said that from his car he had just seen a Pintail drake come down in the deep snow in Denton Park on the other side of the River Wharfe. We tried to find it. Although we did not find the bird we saw its tracks through snow to a small stream of running water. The tracks were curious. Instead of making a long trail with its tail, dagger-like impressions had been produced of about a foot in length, alternating with a foot of clear snow, excepting for foot-marks ; giving one the impression that one leg (or foot) was weak, and that it had been limping, or walking badly, for which at the time I had great sympathy. On Swillington Ing there were a male and two females on December 15th, and one male and one female on December 29th (A. Gilpin).

Pochard.—Three ducks and a drake were on the lake in Lister Park, Bradford, for about a week during the severe weather in February (M. Malone).

Golden Eye.—A pair first seen on Eccup Reservoir on November 11th, last seen there on February 24th, when there were two males and ten females. A pair was seen at Swillington Ing on December 17th (A. Gilpin).

Long-tailed Duck.—A female at Swillington Ing on December 3rd, 10th, 17th and 24th, 1939 (A. Gilpin and H. Walker).

Common Scoter.—One on August 9th and one on August 21st on White Holme Reservoir ; and one on Withens Reservoir on August 17th (H. Notes). A party of 14 at Eccup Reservoir on October 28th, 1939, and one at the same place on April 14th, 1940 (H. Walker).

Goosander.—First seen on Eccup Reservoir on November 11th, 1939 (two females); last seen there on February 24th, 1940 (21 males and 40 females). A female was seen on Swillington Ing on December 10th, 1939 (A. Gilpin).

Smew.—A male at Swillington Ing, December 3rd, 1939 (H. Walker, and two males and one female there on December 29th, 1940 (A.G.). A female on Eccup Reservoir on December 30th, 1939; and one on Golden Acre Park Lake on April 14th, 1940. W. F. Fearnley brought a male in immaculate adult plumage for my inspection, which had been shot on the ice on the Wharfe at Arthington on January 12th, 1940.

Great Crested Grebe.—The species seemed to be unaffected by the severe weather, the usual numbers nesting at Fairburn and other places, including two pairs on the new subsidence at Houghton (R.C.).

Red-necked Grebe.—A bird watched at close quarters on November 16th, 1940, on Swillington Ing could only be ascribed to this species (A. G. Parsons).

Slavonian Grebe.—Seven birds on the highest tarn on Whernside on September 30th, which got up and flew away before full examination, were believed to be ' probably, but not certainly ' of this species (R.C.).

Ring Dove.—Fewer than usual remained through the winter in the Ilkley district. Although they raided greens in gardens they must have found food a difficulty.

Stock Dove.—This bird is nesting in increasing numbers in the ruins of Bolton Abbey (Rev. C.F.T.).

Oyster-catcher.—Of two nests in the shingle of the Ribble, near Settle, one contained two small eggs and a normal one, and the other nest had two normal eggs on June 23rd. The two small eggs subsequently vanished (R. B. Sturdy). The pair on the Austwick Beck, near Clapham, nested again (C. A. Cheetham). W. F. Fearnley heard the notes near Gargrave on July 4th, but information as to the breeding of the few pairs there is lacking.

Ringed Plover.—No nest was found of the pair on the shingle near Settle, but the birds were there (R. B. Sturdy). On May 25th a pair was watched on the swamp on Malham Moor and they would not move far away. I felt sure they were nesting, but although I spent a considerable time there, I was unable to find either eggs or young birds (E. Holmes).

Wading Birds at Reservoirs and Sewage Farms.

Ringed Plover.—Seen in varying numbers up to 23 birds during August and September at White Holme Reservoir and the Elland Sewage Works. Also one at Withens Reservoir on August 10th; and a few on Ringstone Edge Reservoir on September 21st, 22nd, and 29th (H. Notes).

Grey Plover.—One at Ringstone Edge Reservoir on September 14th (H. Notes).

Turnstone.—One at Withens Reservoir on August 10th; one at Ringstone Edge Reservoir on August 18th. At White Holme Reservoir, three on August 27th; one each on August 11th and September 3rd (H. Notes).

Ruff.—One at Elland Sewage Works on August 21st, 22nd, 23rd, and 29th. At White Holme Reservoir, one on August 25th, 27th, and September 1st; and two on August 31st and September 3rd (H. Notes). One at Swillington Ing on October 10th (H. Walker).

Sanderling.—At Withens Reservoir one on August 10th; at White Holme Reservoir one on August 18th (H. Notes).

Knott.—At White Holme Reservoir, four on August 18th, two on August 31st, five on September 1st, one on September 3rd, four on September 8th (H. Notes). Seventeen at Gorple Tip Reservoir on October 20th (E. Watson).

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Dunlin.—Quite over one hundred at Swillington Ing on December 24th (A. Gilpin). In varying numbers throughout August and September at White Holme Reservoir and Elland Sewage Works. Seven at Withens Reservoir on August 11th. Several at Ringstone Edge Reservoir on August 18th. Twelve on the River Calder when partly frozen on January 21st (H. Notes).

Curlew Sandpiper.—At White Holme Reservoir, one on August 31st (H. Notes). At Swillington Ing, one on April 14th, one on September 1st (A. G. Parsons).

Little Stint.—At Elland Sewage Works, one on October 6th (H. Notes). I saw one on the same date, with some Dunlins, at a North Derbyshire Reservoir (Chesterfield Corporation) some 30 miles south (R.C.).

Wood Sandpiper.—At Swillington Inge, one on September 18th (A.G.P.).

Green Sandpiper.—At Swillington Ing, one on August 5th (A.G.). One on August 24th and one on September 1st (A.G.P.).

Spotted Redshank.—At High Royd Sewage Works, one on September 1st (this is the first authentic record for the Halifax Parish) (H. Notes).

Greenshank.—At Swillington Ing, one on August 18th, three on August 24th, and on September 1st. At Golden Acre Park Lake, one on September 28th (A. G. Parsons). At White Holme Reservoir, one on September 1st and 3rd (H. Notes).

Black-tailed Godwit.—At Elland Sewage Works, one on September 10th (the first authentic record for the Halifax Parish (H. Notes).

Bar-tailed Godwit.—At White Holme Reservoir, one on August 18th (H. Notes).

Curlew.—At Stocks Reservoir, on October 3rd, about 150 birds—a late date for so many for the district (R.C.).

Whimbrel.—At White Holme Reservoir, one on September 1st (H. Notes).

Gulls, etc.

Black-headed Gull.—Many more birds stayed throughout the severe winter than might have been expected, with all their usual places for food supply frozen. At Ben Rhydding they competed with Starlings and House Sparrows, as also they did at Rotherham. A. Gilpin reports that many Black-headed and a smaller number of Herring Gulls came on to Eccup Reservoir to rest for the night. I have myself witnessed many gulls coming to Eccup Reservoir, just before nightfall. I have also seen many coming to Malham Tarn at dusk, mainly from the direction of the sea. These subject themselves to very vigorous washings before settling down to rest (H.B.B.). About 15 pairs of Black-headed Gulls nested in 1939 and 1940 on a recent mine subsidence at Houghton (R.C.).

Common Gull.—More common inland than in most winters. Reported from the Halifax Reservoirs in August (H. Notes); around Rotherham in February, where they joined the Black-headed Gulls in competing with Starlings for household scraps (R.C.); and four at Swillington on May 25th (E. Baines). Several were seen at Eccup Reservoir during January and February; and one was found dead at Swillington on March 3rd (A.G.).

Lesser Black-backed Gull.—Between September 27th and October 3rd, I visited various tarns in the north-west fells; on each, several gulls of this species were generally present. I was informed that several pairs had attempted to nest on the islands in the newly-made stocks Reservoir, but the gamekeepers had interfered. A few birds of this species in the West Riding during severe weather in the winter of 1940-41 were probably of the Scandinavian race (R.C.).

Arctic Skua.—In *The Field* of October 5th. p. 449, Messrs. J. A. Hartley and K. Kilburn reported having seen a bird of this species at Malham Tarn on September 4th. ' It was flying in a leisurely way along the edge of the tarn,' and they obtained a perfect view at 15 yards distance. ' It was of the light form, and as its tail was of no appreciable length was probably immature.'

Landrail.—The species was as scarce as ever. I have only two notes of its having been heard this season. A. Gilpin reports two birds calling together from adjoining fields, and saw one of the birds at Pool-in-Wharfedale on May 23rd. One was heard calling at Swillington on May 14th (H. Notes).

Waterhen.—These birds were completely frozen out. Some of them took up curious stations in large private gardens and fields, far from any water ; and their large footprints and straight tracks in the snow cause much speculation. Subsequently in their nesting haunts their numbers were smaller than usual.

Coot.—The species suffered less from the frost than the foregoing, and breeding birds were numerous as ever at Fairburn. On September 26th an estimate of the Coots at Fairburn totalled to between 500 and 600 birds (R.C.).

Red Grouse.—Although they undoubtedly suffered in the severe weather, it is possible that they did not suffer so much as was generally supposed. The keepers informed me that there were large tracts of heather that were blown clear of snow by the strong winds. A few birds were seen on the moor edge near to the village, but not so many as in similar severe winters ; probably because there were not any stooks of oats left out in the fields.

My friend Mr. Bertram Parkinson, of Creskeld Hall, Arthington, reported a curious movement of Grouse in *The Field* of March 23rd, 1940, p. 461. His gamekeeper while going his rounds on February 18th was surprised to see a pack of about 40 Grouse feeding round a potato ' pie,' in the centre of Creskeld Wood. Creskeld is in the valley of the Wharfe, about midway between Otley and Harewood, and if these Grouse had continued their flight in the same direction for 4 or 5 miles they would have been in the City of Leeds ! As it was they were at least about 8 miles from the nearest heather moor. It is noteworthy that when this flight took place the thaw had been in evidence for a fortnight, and also that in 1939 Grouse disease had been widely spread in this district. For the last two years the moors have been slightly shot over ; so that it will be interesting to note if the weak birds have been eliminated and a strong stock survives.

Mr. Parkinson has since informed me that nothing more was seen of this pack of Grouse ; so they evidently made their way back to their native moors.

In the foregoing list, names of those who have supplied the information are given with each record ; the keen band of Halifax observers are denoted collectively (H. Notes). I acknowledge indebtedness to one and all (H.B.B.).

North Riding (W. J. Clarke, F.Z.S.).—

Carrion Crow.—One was seen in the Falsgrave district of Scarborough on February 12th ; another was picked up frozen at the Mere on February 17th.

Hooded Crow continues scarce in the Scarborough and Whitby districts. Several were seen on Saltersgate Moor on February 25th ; and a single bird on Silpho Moor in July. In autumn of 1940 first seen on October 13th (R.M.G.).

Rook.—Nests were busily being repaired on February 13th and 14th in spite of the cold weather.

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Magpie.—Increasing in numbers, especially immediately north of Scarborough ; 40 were seen together on December 20th, 1939.

Jay.—R.M.G. has noticed an increase in numbers during the autumn. Immigration has been suspected in Scotland.

Hawfinch.—Noted with some Redwings on a whitethorn hedge at Pickering on November 27th (R.M.G.).

Twite.—T. N. Roberts saw four at the mouth of Scalby Beck on September 3rd and got a good view of them through glasses.

Siskin.—A party of 12 in Ellerburn on October 15th, 1939. 30 seen at Thornton Dale on October 29th, 1939 ; and one on February 8th, 1940.

Brambling.—Arrived near Thornton-le-Dale on October 5th, 1940 ; on December 28th, 1940, about 100 in Ellerburn Wood (R.M.G.).

House Sparrow.—Reported absent at Thornton Dale after the frost.

Corn Bunting.—Scarce in the North Riding in many districts where formerly it was common. A pair bred at Thornton in 1940.

Lapland Bunting.—A small flock was seen near Spennithorpe in January and February, 1940, often accompanied by Chaffinches (J.P.U.).

Snow Bunting.—Several seen at Rosedale on October 13th, 1939, and at Scarborough Castle on October 7th, 1939. A party of 13 on Scarborough Castle Hill on January 6th, 1940. A party of six near Goathland on December 19th, 1940 (R.M.G.).

Pied Wagtail.—Very scarce near Scarborough after the frost ; 8 or 9 at Keld Head, Pickering, on December 13th, 1939.

Water Pipit.—Two arrived at Keld Head, Pickering, on December 2nd, 1939, and were still there on January 3rd, 1940, on February 2nd, 1940, and were last seen on March 9th and 10th. The species is present again this winter, three being seen on November 16th, 1940 (R.M.G.).

Nuthatch.—The single bird that has frequented the neighbourhood of Sleights for several years was seen to have a companion for the first time in December, 1939. They have not been seen since the cold weather (A.S.F.). One bird was seen at Goathland by Mr. Ward on April 24th, 1940, Capt. Medlicott satisfying himself as to correct identification. One seen near Castle Howard by R.M.G. on December 7th, 1940. One seen in Arncliffe Woods on December 25th, 1940 (A.S.F.). It will be interesting to see if the species becomes established thereabouts.

Long-tailed Tit.—The species withstood the cold spell fairly well. A party of ten were at Thornton Dale on January 3rd ; four on March 3rd ; and two pairs nested there. A pair was seen at Forge Valley on May 21st.

Goldcrest.—A.S.F. has not seen a single bird in the Egton district since the frost of early 1940. Several seen on the coast at Scarborough on October 16th, 1939.

Great Grey Shrike.—On December 23rd, H. Stobart saw one near Kingthorpe ; on the same date one was killed on wires north-east of Pickering. And see A. Hazelwood's report.

Pied Flycatcher.—Fewer birds in the Goathland area since the frost. A single pair was seen in Forge Valley on May 20th. A nest in a hole in a mountain ash was found by Mr. Asquith Wood in Arncliffe Woods on May 14th.

Chiffchaff.—A late bird was seen near Scarborough Castle on October 25th by R.M.G.

Grasshopper Warbler.—Heard singing at Flaxdale on April 28th.

Reed Warbler.—More pairs than usual visited Scarborough Mere. A nest was built in willow stems on May 29th but was destroyed. At least three other nests were under observation among the reeds.

Song-thrush.—Almost disappeared from Whitby district following the frost, and see A. Hazelwood's notes.

Redwing.—A flock was seen at holly berries in Thornton Dale on January 16th, 1940. Also see prior to detailed lists for summarised

report on the species. Both Redwings and Fieldfares were abnormally scarce about Whitby in 1939-40 winter (A.S.F.).

Blackbird.—Two pied birds seen in same tree by Scarborough Mere on November 15th, 1940 (R.M.G.).

Robin.—Unusually numerous on October 15th about Scarborough Castle ; some pale-breasted birds were probably continentals (R.M.G.).

Hedge Sparrow.—A bird with pure white crown and moustachial stripe at Ellerburn on November 3rd, 1940 (R.M.G.).

House Martin.—The species maintains increased numbers in the country villages, but is scarce about the towns. Plentiful at Pickering, 6 nests on one building, 4 on another, and many with 3, 2, and single nests. 12 occupied nests on Highdale Farm. Many sites unoccupied for years have been retenanted this year. Two birds were still in Thornton Dale on November 4th.

Lesser Spotted Woodpecker.—A male was seen drumming at Castle Howard on April 20th.

Swift.—First seen at Scarborough on May 11th, 1940 ; last seen at Pickering, where the bird was very numerous on August 15th.

Barn Owl.—A nest was seen at Levisham with five young (ringed) on July 11th.

Little Owl.—One seen on March 25 near Cayton.

Peregrine Falcon.—A bird was seen by R.M.G. over the Vale of Pickering on November 22nd, 1940.

Merlin.—A bird was seen on the moor near Goathland on December 19th, 1940 (R.M.G.).

Hen Harrier.—A male was seen near Thornton Dale on November 15th, 1939. A male also seen in the Vale of Pickering on November 22nd, 1940 (R.M.G.).

Montagu's Harrier.—Seen on two parts of the North Yorkshire Moors in 1940 ; an adult female (or a young bird) was seen by R.M.G. on August 24th. Eggs were looted in one case.

Grey Geese.—Three lots passed over Thornton Dale during week before October 18th, 1940 (R.M.G.).

Bean Goose.—A dead bird was seen on the south sands at Scarborough on March 6th, 1940.

Whooper Swan.—Six on flooded vale near Thornton Dale on February 29th, 1940. Three seen at Goathland on February 24th were probably of this species. 20 Whoopers were reported by J. P. Utley on Semerwater from November 11th, 1939, to December 17th, 1939, after which their numbers reduced, to disappear completely with the surface of the water frozen. On January 14th, 1940, five birds were sliding about the ice and were afterwards seen no more. The species usually remains about the lake until May.

Mallard.—Two full-winged wild albinos appeared on the fishpond at Scarborough on August 25th, 1940. They were all white with yellow bills and feet, and were accompanied by a semi-albino with white wings, head, and neck, the remainder being brown.

Teal.—See notes of ringed birds.

Wigeon.—In *British Birds*, August, 1940, evidence of breeding in 1939 by an unspecified tarn in the North Riding was published by C. S. Graham and T. P. Hewitt. On June 15th, 1940, the same observers at the same place flushed two Wigeon ducks and found ducklings, while three Wigeon drakes flew round overhead.

Tufted Duck.—A pair on the fishpond at Scarborough on February 17th, 1940, and many others were seen there on various dates up to March 23rd, 1940. About 30 at Thornton Dale on February 13th, 1940.

Scaup.—Many in the harbours at Scarborough and Whitby during January to March, 1940.

Goldeneye.—Several, including an adult male, in Whitby Harbour at the end of January, 1940 (A.S.F.).

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Long-tailed Duck.—Two adult males in Scarborough Harbour on February 17th and one on March 26th.

Common Scoter.—A male at Keld Head, Pickering, on February 14th, 1940.

Velvet Scoter.—Two were seen by W. A. Clark among a party of Common Scoters, off the Marine Drive, Scarborough, on January 27th, 1940.

Goosander.—A young male in the upper harbour, Whitby, on January 25th, 1940 ; and a male in black and white dress below Sleights on February 14th (A.S.F.).

Red-breasted Merganser.—A male and female in the outer harbour at Whitby on February 2nd, 1940. On February 15th there were three males and two females in the upper harbour catching fish every few minutes, with large gulls swooping as fish were brought to the surface, but the Mergansers were too quick for the gulls. On February 18th there were 12 feeding together and two pairs a little apart. Four were present on March 1st, which had become two on March 8th (A.S.F.).

Smew.—An adult male at Thornton Dale on February 13th, 1940.

Fulmar.—40 to 50 birds at Scarborough on January 19th, 1940 ; two had been seen on December 12th, 1939.

Great Northern Diver.—One near Scarborugh Harbour on November 11th, 1939.

Great Crested Grebe.—One in Whitby Harbour on February 2nd, 1940 ; one caught alive at Whitby on February 5th. Two in the harbour near the fish market on February 6th. One picked up dead on the beach at Whitby on February 7th. In the breeding season birds were normal.

Red-necked Grebe.—One at Pickering on October 29th, 1939 ; another at the same place on February 2nd, 1940.

Stone Curlew.—There was no definite record in 1940.

Golden Plover.—Scarce on the moors near Scarborough in spring, but reported numerous on Rosedale Moor.

Lapwing.—Very scarce about Thornton Dale after the frost. A flock of several thousands passed over Scarborough from an easterly direction at 9-30 a.m. on March 20th, 1940. Hundreds were seen between Ganton and Staxton on July 23rd, 1940.

Dunlin.—See notes of ringed birds.

Green Sandpiper.—One at Thornton Dale on February 4th, 1940.

Greenshank.—One seen in the upper harbour at Whitby on January 13th, 1940 (A.S.F.).

Grey Phalarope.—One seen on North Sands, Scarborough, on February 2nd, 1940, by G. B. Horsman.

Curlew.—The species breeds much more commonly in the western parts of the North Riding than near Scarborough, where pairs nested on Seamer Moor and at Thorn Park in 1940.

Caspian Tern.—Two records have recently been established for the North Riding (see note by H.B.B. in *The Naturalist*, 1941, p. 1). One was picked up on the shore at Whitby in August, 1939, but the record was not published until the October, 1940, issue, of *The Auk*. This bird had been ringed as a nestling on an island in Lake Michigan, U.S.A., on July 14th, 1927. In commenting on the occurrence, Mr. Witherly, in *British Birds*, says, ' A very rare vagrant to this country. Some 30 occurrences are on record and most of these have been on the east coast of England. This fact has seemed to point to Europe as their origin and probably most of them did come from the east, but the present record shows that it is possible for the bird to come from America and yet reach our East Coast.' The A.O.U. separates the American bird, but Mr. Whitherby has been ' unable to find any constant difference between American and Palæarctic birds ' ; and quotes Dr. J. C. Peters, *Check List of the Birds of the World* to the same effect. Dr. Roberts reports that the second bird was an immature specimen, and was picked

up dead by Mr. Hitching of Kirby-in-Cleveland on March 19th, 1940, and was identified at the York Museum (F. Jefferson).

Common Gull.—See notes of ringed birds.

Glaucous Gull.—One in cream plumage in Scarborough Harbour, February 12th to 26th, 1940 ; 4 immature birds on January 6th ; 3 on January 19th ; one at Scarborough on February 23rd. At Whitby, where never before had more than one specimen been recorded at once, there were 6 on January 11th ; and 9 on January 12th, of which two were adult ; they remained for about a fortnight (A.S.F.).

Greater Black-backed Gull.—Several seen inland in autumn of 1940. About ten, with numerous Herring Gulls at a heap of fertiliser near Malton on December 31st, 1940 (R.M.G.).

Kittiwake.—An immature bird was found dead at Pickering on March 3rd, 1940. A pair nested in Scarborough Castle cliff in 1940.

Little Auk.—One was picked up alive in a Scarborough street on February 19th, 1940.

Corncrake.—A few have returned this year to the Thornton Dale district. Mr. Shelton reports about ten pairs in the Ayton district in 1940. One was heard by H. H. Farwig at Hackness. It was frequently heard near Wombleton ; and a bird was picked up dead beneath the wires near Thornton Dale station on May 10th.

Water Rail.—A bird was flushed by R.M.G. near Pickering on November 23rd, 1940.

Waterhen.—A pair excavated a hole in the thatch of the hut in the middle of Scarborough fishpond and built a nest there in the spring ; nest and bird were quite invisible from outside.

Red Grouse.—Owing to afforestation now seldom seen on the moors near Scarborough. The only birds reported are two near the Falcon Inn on March 24th, and two at Stainton Dale on March 31st.

The recorder is greatly indebted to Messrs. A. S. Frank, R. M. Garnett, W. S. Medlicott, T. N. Roberts, and E. A. Wallis for notes that have been used in the compilation of this report.

East Riding (C. W. Mason).—

Records made by G. H. Ainsworth and J. Lord concerning birds affected by the frost have been published in *The Naturalist*, and others have been used in the preliminary remarks of our Editor, and in the report by A. Hazelwood on birds found dead.

Migrants arrived about their usual dates, Sand Martins being seen over Hornsea Mere on March 28th (G.H.A. and J. L.) Swallows were first reported for Cottingham and Dunswell on April 11th (C.W.M.).

Willow Warblers and Blackcaps were seen at Hornsea on April 19th (G.H.A. and J.L.). On the same date, on the Mere, the ducks included Pintail and Wigeon.

The autumnal migration, particularly on the coast, found few watchers this year and opportunities to visit the places of greatest interest were not available. We are told an unofficial notice forbidding entrance to one haunt ran; 'Those found here at night will be found next morning.'

Nesting dates were not abnormally late. Rooks were busy on March 10th. At Hornsea, on April 19th, Thrush and Blackbird, Coot, Waterhen and Stock Dove all had eggs. Herons were feeding young although a number of the early-hatched young herons perished. The main difference attributable to the cold weather lay in the reduced numbers of some species. Moorhens and nesting ducks at Hornsea, and Shelduck along the Humber side were normal ; but Mute Swans were fewer. Grebes were unaffected. Long-tailed Tits were in normal numbers. One pair at least of the Hornsea Kingfishers managed to survive the winter and to breed. Species badly reduced are included in the following records.

Carrion Crow.—Nested commonly in hawthorn bushes at moderate heights along the Humber foreshore (G.H.A. and J.L.), as they have done back to 1908 at least (C.W.M.).

Yellow Wagtail.—The late W. Eagle Clark described the passage of this species up the tributaries of the Humber to the breeding valleys of the Dale country. The route is still used. On May 7th there were numbers of cock birds in the reeds at Aike (G.H.A.). Breeding Yellow Wagtails were very numerous in many parts of Yorkshire in 1940.

Willow Tit.—A nest containing young was found at Allerthorpe on June 3rd, 1940; the dull cap was observed at very close quarters in a good light, and the characteristic ' nasal ' notes heard. The species also nests at Houghton (G.H.A. and J.L.).

Long-tailed Tit.—Several family parties seen in June at Hornsea, Allerthorpe, and Houghton Woods (G.H.A. and J.L.).

Goldcrest.—The species suffered badly from the cold and very few were seen (G.H.A. and J.L.).

Chiffchaff.—Nested at Houghton Woods, May 26th, 1940. There are very few breeding haunts of this bird in the East Riding (G.H.A. and J.L.).

Reed Warbler.—A nest with four eggs was seen at Hornsea Mere on May 23rd—a somewhat early date (G.H.A. and J.L.). The colonies near Patrington and on the River Hull, and at Skipwith were normal.

Wren.—No nest was seen this year although several birds were heard. The species normally is common; and the diminution due to the hard weather was very noticeable (G.H.A. and J.L.).

Green Woodpecker.—A nest was seen at Allerthorpe on June 2nd, 1940, where the species occurs in fair numbers (G.H.A. and J.L.).

Great-spotted Woodpecker.—A nest with young was seen in Houghton Woods on June 9th. Also breeds near Hornsea, Allerthorpe, Burton Constable, and Skipwith (G.H.A. and J.L.).

Bittern.—An emaciated bird caught near Hedon on March 9th died subsequently (C.W.M.). A dead bird was seen at Hornsea Mere on March 11th (G.H.A. and J.L.). Another dead bird was seen at Wassand on May 19th (C.W.M.).

Pink-footed Goose.—Several gaggles flew over North Ferriby from the Humber on October 18th, and over North Cave district on October 24th. Several large gaggles came over Reighton on November 1st (T.H-P.).

Shoveler.—A drake seen at Hornsea Mere on May 18th may have had a mate. We found a nest of this species on the Durham side of the Teesmouth marshes on April 20th (G.H.A. and J.L.).

Pochard.—Two nests seen at Hornsea Mere on May 18th, with 8 and 10 eggs respectively, were only separated by 10 yards. Other pairs were nesting (G.H.A. and J.L.).

Tufted Duck.—Nests were seen at Hornsea on May 23rd and 30th. A pair was noted on the River Hull on May 7th. Tufted Duck and Pochard which left the East Park Lake, Hull, during the frost, returned after the thaw with several Wigeon; last seen there on March 7th (G.H.A. and J.L.).

Scaup.—East Park Lake, Hull. A duck was present on March 3rd and a drake on March 7th. There was a drake on Hornsea Mere on March 28th; and again as late as May 18th (G.H.A. and J.L.).

Goldeneye.—A flock of some 50 birds on Hornsea Mere on March 10th had become reduced in numbers by March 28th. Many were still there on April 20th. On May 4th one bird was seen (G.H.A. and J.L.).

Goosander.—A bird was found dead on the Humber foreshore on February 22nd (C.W.M.).

Gannet.—Birds were on the cliff and probably nested; but no one went down, and it was not possible to see young birds from the cliff top.

Fulmar.—This bird is still extending and is nesting as far south as Sewerby. At Whitsuntide, six birds were sitting between Dane's Dyke and Sewerby, and there were probably others (G.H.A.). Local observation indicates a continuance of the gradual growth in numbers of the species at Bempton and Speeton.

Slavonian Grebe.—Two birds were noted at Hornsea Mere on March 10th, and on the same day three were picked up dead on the beach near Bridlington. A bird was seen near Cherry Cob Sands in full breeding plumage on April 28th (G.H.A.).

Ring Dove.—Large flocks did much damage to greens in gardens and fields during the severe weather. On January 31st men were shooting them all day at Cottingham, and birds were selling at 2d. and 3d. each. On February 7th no birds were visible at Cottingham until some came in to roost. On February 13th large flocks still remained at Skidby (C.W.M.). There are reports of similar damage from other districts. Flocks still remained at Hornsea Mere on May 4th (G.H.A. and J.L.).

Curlew.—The number of breeding pairs on Allerthorpe and Skipwith Commons was normal.

Little Tern.—The colonies at Spurn had a normal season (C.F.P.).

Black-headed Gull.—Young birds were seen on Skipwith Common on June 15th when the colony numbered some 200 birds (R.C.). No birds were present this year at Allerthorpe Common, where a small colony was reported for 1939 (G.H.A.).

Guillemot.—Reports state that there were more young birds on the sea below the cliffs in July and August, 1940, than for many years past, due no doubt to the abandonment of 'climming' and the undisturbed hatching of eggs laid at the species' normal time. See prior note re Northern Guillemot by A. Hazelwood.

Landrail.—A bird was heard near Hornsea Mere constantly throughout the season (J. W. Medcalf).

Waterhen.—Numbers of breeding birds along the River Hull and elsewhere were maintained, and clutches were normal numerically; but there appeared to be many more small-sized eggs than usual (G.H.A. and J.L.).

York District (E. W. Taylor).—

The York area is undefined and the following notes include territory which is in one or other of the Ridings. The initials relate to the following: Mr. Sydney H. Smith, of York (S.H.S.); Mr. Fred Jefferson, of Haxby (F.J.); Mr. E. Wilfred Taylor, of York (E.W.T.).

The winter 1939 to 1940 was remarkable for its severity and the country was frost-bound for the whole of January and most of February. Many species of birds had to adapt themselves to most unusual conditions or perish in the attempt. The summer that followed was extraordinary for a rare prodigality of fruits and seeds and was both dry and sunny (E.W.T.).

Some species of birds suffered great hardship, the Wren in particular, and its numbers have not been made up by birds from further south. It is still a rare bird in this area (E.W.T.).

The Wren and the few Goldcrests we can usually expect to see in the district were practically wiped out. Two Goldcrests huddled together for warmth were picked up in a cowshed at Haxby, but were too exhausted to recover. I have not seen a single nest of the Wren in the Haxby, Wigginton and Strensall area this season (F.J.).

During threshing operations upon a farm near Haxby many dead bodies of Greenfinches, Chaffinches and Starlings were discovered as the sheaves of corn were unpiled in the Dutch barn (F.J.).

Black-headed, Herring and some Lesser Black-backed Gulls were a common sight around York in the early months of 1940 (F.J.).

January 21st. Heavy snow on the ground and water pipes frozen all over York. Many dead birds about; Rooks, Pigeons, Starlings, Blackbirds, Thrushes, Fieldfares, etc. (S.H.S.).

Missel Thrushes and Fieldfares did not appear to suffer unduly, but Waterhens fared badly, and one wondered whence all the Coots came that attached themselves to the lake at Castle Howard. Both Black-headed and Herring Gulls suffered severely (E.W.T.).

I have never known Waterhens to be so scarce in this district and few nests were found during the spring (F.J.).

The Titmice, including the delicate-looking Long-Tailed, do not appear to have suffered any reduction in numbers, and this applies also to the Finches (E.W.T.).

The Long-tailed Tit does not appear to have suffered from the arctic weather and I have seen several nesting parties. A nest was found at Strensall April 18th, 1940 (F.J.).

In mid-February, Wood Pigeons were invading vegetable gardens for brussel sprouts—about the only green tops showing above the snow. Turnip tops were completely hidden (F.J.).

Hundreds of Wood Pigeons cleared all the brussel sprouts in the garden (S.H.S.).

Subsequently to all this, lists supplied by S. H. Smith, J.P., and F. Jefferson confirm the view that dates of arrival of most of the spring migrants were only a little late. Some came to normal time. The Chiffchaff was recorded at Ampleforth on March 23rd. The Swallow and Cuckoo were seen at Haxby on April 18th and 20th respectively. The Swift on May 11th, at both Heworth and Haxby, was not delayed unduly.

Starling.—A bird with a white rump nested at the cocoa works and, except for a month or so after the young had left the nest, has been seen daily up to this date (February 6th). A clear proof that all Starlings are not migratory (F.J.). And see Ringed Birds.

Corn Bunting.—This species is increasing in numbers in the York district (E.W.T.).

Corn Buntings have been more numerous in this area than in previous years (F.J.).

Yellow Wagtail.—Appeared in unusual numbers and was seen in many new localities (E.W.T.); and in other districts in the north of England the bird was unusually numerous (R.C.).

Great Grey Shrike.—Observed for about a week at the end of January near Ampleforth College. On one occasion was seen to be carrying what appeared to be a small bird (F.J.).

Grasshopper Warbler.—This species was neither seen nor heard in the Haxby district (F.J.).

A pair nested in the neighbourhood of Shipton (E.W.T.).

Sedge Warbler.—Absent from the Haxby area (F.J.).

Whitethroat.—All the Warblers appear to be slowly decreasing in this area and this applies particularly to the Whitethroat (E.W.T.).

Lesser Whitethroat.—Particularly numerous in the Haxby district (F.J.).

Missel Thrush.—Uncommon during the nesting season and only isolated pairs were noted, whereas normally they are well distributed (F.J.).

Kingfisher.—Upon one long stretch of the River Foss, near Strensall, where the bird has nested to my knowledge from 1920 to 1939, not a single brood was reared and only late in the autumn was a single adult bird seen. The clearing of the river may be partly responsible (F.J.).

Mallard.—Following the clearing of the River Foss, resulting in few weeds and a faster current, one rarely disturbs Wild Duck in parts that they used to frequent (F.J.).

Strensall Common practically ceases to be a nesting haunt of Wild Duck as extensive drainage has been undertaken in the interests of the Military (F.J.).

Great-crested Grebe.—Two pairs nested on the great lake at Castle Howard and each reared two young (E.W.T.).

Turtle Dove.—Well distributed in the York area and increasing (E.W.T.).

Common Sandpiper.—Seen in spring and autumn along the River Ouse and on the margins of lakes and ponds in the area (E.W.T.).

Curlew.—Night and day manoeuvres on Strensall Common have disturbed the Curlew, and I doubt if more than one pair nested there during the spring of 1940. The birds have not left the York district, however, and now nest on the rough sheep pastures to the north of the city. A Curlew I was photographing between Wigginton and Haxby left her nest to drive away a curious sheep. Within a few minutes her cries brought her mate and three other pairs to the scene. One could only assume that they also were local nesting birds. Prior to the Military manoeuvres, big fires on Strensall Common drove many Curlew to nest elsewhere (F.J.).

Snipe.—On January 27th a Snipe was picked up in Blossom Street, York, in an exhausted condition and died within an hour (F.J.).

Caspian Tern.—See North Riding Report.

Black-headed Gull.—This species is developing a predatory habit towards the Lapwing when the latter are feeding in the fields. The Gulls mix with them and as soon as a Plover secures a grub or worm a Gull swoops down and usually manages to secure the prize before the Plover can swallow it. I first observed this habit some years ago and it is now practiced much more commonly (F.J.).

Landrail.—Only four birds were heard calling within a five miles' radius of the city of York, and as they were not heard to call with any regularity it is not certain that they settled down and nested or even that they were all different individuals (E.W.T.).

Red Grouse.—On August 31st small parties were seen late at night flying about the Hermitage on the Malton Road. This was a result of raiders' bombs and fire on the Helmsley Moors (S.H.S.).

UNIVERSITY OF LONDON CERTIFICATE IN NATURAL HISTORY

The University of London has now published amended regulations (applicable for the duration of the present emergency) for its Certificate of Proficiency in Natural History. The new scheme takes advantage of the fact that large numbers of urban teachers are now located in the country or at the sea-side and so presented with an opportunity of Natural History study in the field which, under normal peace-time conditions, would have been impossible. The requirements embrace a directed course of private reading at home, attendance at a Practical Laboratory Course of two weeks' duration in the summer, an approved plan of field-work suited to the student's locality to be written up in the form of a substantial essay, and examination. Copies of the regulations and syllabus may be obtained from the University Extension Registrar, University of London, at Royal Holloway College, Englefield Green, Surrey.

Several Local Education Authorities are prepared to consider sympathetically applications for financial grants-in-aid from teachers in their areas who wish to study for the Certificate.

REVIEWS AND BOOK NOTICES

Transactions of the Bradford Natural History and Microscopical Society. Report of the Molluscan Section, by **Fred Booth.** This

report begins with a short résumé of the geological features of the country investigated. The area was as follows : (1) The drainage of the River Ribble from its source to the Leeds City Boundary ; (2) The Yorkshire portion of the Lune drainage ; (3) The drainage of the River Wharfe from its source to its confluence with the River Washburn at Pool, excluding the Washburn Valley. The records date from 1881 to 1921. Originally Messrs. Beanland, J. W. Carter, J. A. Hargreaves, F. Rhodes, H. F. Soppitt, and Wm. West undertook the investigation of this large area, with John W. Taylor and W. Denison Roebuck as referees. It was largely due to the two latter that some of the more critical specimens were determined. It must have been about this time that W. Nelson made his large collection of land and freshwater mollusca. As will be seen, all the foregoing names were of members of the Y.N.U. They have left behind records which are of great interest to present-day conchologists. Their reliable pioneer work is a legacy which those who carry on keenly appreciate. So well done was the area covered that there seems little chance of making new ' captures ' to add to the already existing species and varieties found by them. It is pleasant to see that Dr. W. E. Collinge, Dr. J. W. Jackson and Mr. J. R. le B. Tomlin were among those who contributed to this great piece of work. They are still active workers and have helped many new members in their early struggles. They were all practical field naturalists. It has been my privilege to visit many of the habitats appearing in the transactions and to find the species mentioned are still thriving there.—Elsie M. Morehouse.

[The Bradford Natural History and Microscopical Society has on hand a number of printed copies of the mollusca records compiled by the Society between 1875 and 1921. Anyone wishing to obtain one or more of these may have them for cost of postage on application to Mr. Sidney Jackson, 28 Mount Terrace, Eccleshill, Bradford.—Ed.]

The Truth about the Cuckoo, by **Edgar P. Chance,** pp. xvi+207 with 38 illustrations and 2 maps. Country Life, 12/6. Mr. Chance's book, *The Cuckoo's Secret*, published 19 years ago, was an outstanding contribution to the more serious literature of ornithology. Since that day the author has followed up his work on the same thorough, painstaking lines, and this new book brings together all his researches on the habits of the Cuckoo. The result is a volume which will be the chief reference book on the subject for years to come. Mr. Chance's methods are very well known, and by them he has determined such knotty points as the number of eggs laid by an individual Cuckoo in one season, whether the egg is laid direct in the nest of foster parent or is subsequently placed there, and how strictly the individual Cuckoo keeps to one type of foster parent. It is only fair to say that in the reviewer's opinion Mr. Chance has proved his points. The conclusions he had arrived at in 1922 and earlier have been justified by his more recent investigations, and other observers have endorsed his findings. *The Cuckoo's Secret* has been out of print and scarce for some years, and the wise ornithologist will invest in the new volume while copies are still obtainable.

The Entomologist for February contains ' Specific names in the *Erebias*, and others,' by G. Wheeler ; ' Records of a New Forest moth trap,' by C. W. Mackworth-Praed ; ' Mass movement of *Pieris brassicæ* and *P. rapæ*,' by Brig.-Gen. J. B. G. Tulloch ; ' New ants from Waigeu Island, New Guinea and the Solomons,' by H. Donisthorpe ; and numerous Notes and observations.

The Entomologist's Record for March contains ' The Melanic Forms of *Ortholitha mucronata* Scop. and *O. scotica* Cockayne,' by E. A. Cockayne ; ' Glanures Myrmecologiques,' by H. Donisthorpe ; Collecting Notes, Current Notes, and Supplements, ' Records and Full Descriptions of Varieties and Aberrations ' and ' The British Noctuæ and their Varieties,' by H. J. Turner.

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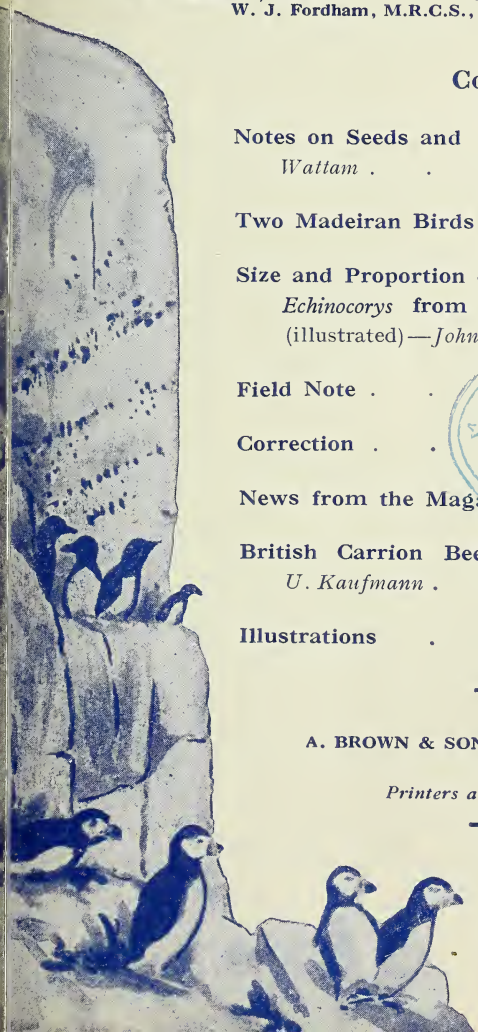

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NOTES ON SEEDS AND SEEDLING PLANTS

W. E. L. WATTAM

Maturity of the Seed of Lupin (Lupinus polyphyllus) As the result of many complaints and enquiries as to the apparent non-fertility of the seed of the hybrids of the Common Lupin (*Lupinus polyphyllus*), and more especially of the Russell variety, I decided to try out a lay-over experiment. I venture to suggest that the proven results appear to show that seed kept in store and unplanted for a period of two years result in the maturity of the seed being more fully attained at the expiration of that period of time than that of the season immediately following the production of the seed. Seed produced in 1936, planted April, 1937 (50 planted), yielded 20 plants, whilst further seed gathered in 1936 and planted April, 1938 (160 planted), produced 99 plants. Again seed produced in 1937, planted April, 1938 (50 planted), produced 17 plants, whilst further seeds gathered in 1937 and planted April, 1939 (100 planted), produced 68 plants. Moreover, the sites used for the planting during the four years covering the experiments were only partially disturbed for removal of the seedling plants which had emerged and such sites were purposely left untouched, but further germination was most meagre. There was no special soil preparation. Having 52 seeds of the 1936 and 1937 crops left over I planted these in April, 1940. As further evidence of latent vitality and strengthening the assumption gained from the tests commented upon 38 of these seeds germinated and have produced excellent plants.

Echium Vulgare L. (Viper's Bugloss)

Whilst inspecting the ruins of Jervaulx Abbey in October, 1937, it was noticeable that this plant was becoming well established, and from a few remaining decayed flowers I succeeded in extracting seven rugose nutlets. These I planted in the garden in April, 1938, but only two germinated. The limited growth of these seedling plants to the end of November, 1938, was a dwarf rosette of small, hispid, lanceolate tapered leaves; the circumference of this rosetted growth was $4\frac{3}{4}$ in. The plants were but little affected during the winter. Vigorous growth recommenced in April, 1939. The leaves still retained the rosetted form of growth reaching a length of 7 in. and were exceedingly hispid. By the end of June the stout main bristly stem had attained the height of 20 in. From the axils of the first and second rings of leaf growth arose 12 additional flowering stems, and these as well as the main stem produced a glorious wealth of the typical red-purple flowers.

JUN 9 1941

Senecio Jacobæa L. (Common Ragwort)

This conspicuous plant of ill-kept pastures and roadside waste has, if judged from my own experiment in raising it from seed, no great seed fertility, only 17 seeds germinating from 70 produced by a single corymb gathered in September, 1937. The seeds were planted in April, 1938, upon a heap of coarse garden rubbish. Three seedling plants were selected for observation, the remaining 14 being destroyed. The first year's growth was slow, the production being a rosette of two-pinnatifid leaves with a prominent terminal lobe, each leaf averaging 2 to 2½ in. in length. This rosetted growth was little affected throughout the winter. Early in April, 1939, growth became most pronounced. By mid-May the basal leaves had attained a length of 6 in. The main stems of the plants by the end of July were 3¼ ft. in height, terminating in a dense corymb of bright yellow flowers. Surrounding each main stem, produced from the axils of basal leaves, were seven other stems averaging 14 in. in length and each terminating in a dense corymb of flowers. Seed maturity, which was very poor, was attained by the end of August. I dug up the plants in the early part of September and there was disclosed a thick fleshy rootstock giving rise to a much-forked root system.

Juncus Effusus L. (Soft Rush)

There is no member of the Rush family more prominent and abundant in the Huddersfield district (V.C. 63) than the subject of my notes. The ill-drained pastures, especially those bordering upon the moorland areas, and the swamps which receive the drainage from the steep sides of numerous of these rough pastures are so densely populated in places by *Juncus effusus* that there is no necessity to describe in detail the plant itself. The immense perennial clumps of truncated rootstocks give rise to miniature forests of stems from 2 to 3 ft. in height, soft and pliant, devoid practically of leaves which are represented by a few sheathing scales. In July the globose cyme of flowers are produced in great numbers. I have oftimes been puzzled with the rapidity this plant has established itself in the moist parts of pastureland, and the still greater rapidity with which areas of rough pasture have been conquered to the detriment of other more useful vegetation, where the water supply is practically stable. I came to the conclusion that solution would best be sought for in noting seed production capacity, testing the fertility thereof and the means by which the seed was dispersed. It was only too well evidenced that once colonies of plants become established and there was no disturbance, they could and do destroy valuable pasturage. In the latter part of August, 1937, I

gathered fifty ripened cymes from plants growing in swampy ground near to Stocksmoor, this particular pasture being one of those areas which, until a few years previously had been rush free, but where in late years the plant had become most pronounced. Along the south-west border of this pasture runs a stream where *Juncus effusus* grows in quantity. In October I shook out the ripened seeds and filled two ordinary sized test tubes. Roughly, judged after extracting 500 seeds for test purposes, the 50 flower cymes had produced about 4,000 seeds. The seed is ovate in shape, margined dark brown, pointed at each end, has a slightly rough coat and is yellow in colour. On April 19th, 1938, I planted the 500 seeds in a compost three parts decayed sod and one part sand and kept this moist. Between May 6th and 20th 488 seedling plants germinated. These seedlings made a pretty picture as each first dark green stem bore at its apex the testa. By July 30th the average height of these plants was $1\frac{3}{4}$ in. From the brief rootstock many white roots had emerged, these being 2 in. in length. The basal sheaths were small and brown in colour. The original cotyledon was now dead. The continued growth exhibited no striking features. In order to check the sheltered condition growth of the seedling plant I kept constant observations on certain selected sites at Hade Edge, Dunford Bridge, Stocksmoor, and Netherton. I derived most knowledge from extensive zones of this plant extending from Hade Edge to Dunford Bridge, close to the moorland boundary. On April 18th, 1938, I came across colonies of small seedling plants from one to two year's growth which had given rise to either three or four stems. Other seedling plants, estimated at three years of age, had produced six to eight stems, all springing from a short thickened rootstock. On June 23rd, 1938, further observations within this area revealed numbers of newly sprung seedling plants, which, upon examination, agreed in all respects with the seedlings grown under sheltered conditions. The more dense zones gave but poor results for seedlings. On the outer verge of other clumps there were large numbers of partially germinated seeds, which were either dead or dying through lack of proper hold by the young radicle. Where the areas were more open, especially where the sphagnum moss is abundant, these produced seedlings in great quantity, and also an abundance of young plants of one and two years growth. Decaying flower stems indicated that flowers had been abundant in 1937 and one may assume that the seed yield would be great, but lack of suitable matrix made it evident that the struggle for existence did not permit of complete germination from the embryo stage of the seedlings plants. The plants within the closed zones rely chiefly upon the vegetative rhizomatous rootstock and its branches for

future extensive growth. Plants growing in depressions where sphagnum moss had accumulated and where the water content is constant send out into the water long white roots. Plants examined in such a habitat at Dunford Bridge on June 23rd, 1938, had produced white roots 10 in. in length. The true fixidity roots of *Juncus effusus* are dark brown in colour, of a strong woody nature, their apex being covered with soft hair.

It would therefore seem that why this plant so readily establishes itself is due in varying degrees to the following factors :

(*a*) The seeds are produced in enormous quantity and the percentage of fertility is excellent.

(*b*) The dispersal of the seeds is due chiefly to grazing animals and human agency, and possibly in some degree by small mammals, whilst wind dispersal will be amply effective. Possibly birds also give assistance.

(*c*) Once the seed finds suitable habitat it firmly establishes itself unless rigorously controlled by competent husbandry.

(*d*) The burning of the closed zones of established plants is but a poor remedy to kill the plant as the much protected rootstock practically remains untouched. Ploughing out and destruction of the old plants and a thorough drainage system causing a lack of stable moisture, are the natural remedies to keep the plant in check.

The Plant Life of New Ploughed Land

The request to farmers to increase arable cultivation has affected the Huddersfield district (V.C. 63), where, taken as a whole, the land under arable cultivation is very small when compared with the large acreage of grassland in general. Many local farmers have taken advantage of the premium payment to bring under the plough harsh, sour pastureland and it has been interesting to note the results arising during the first year of the conversion. Certainly some startling vegetative reclothing has resulted. For comment I have selected two of my observations, both being of land which, within my own knowledge, have never been broken by the plough.

Observation 1.—This area has always been an ill-kept pasture and rough grazed. The grass dominants were *Agrostis vulgaris*, *Deschampsia flexuosa*, *Festuca ovina*, and stray patches of *Anthoxanthum odoratum* and *Dactylis glomerata*, bordered on the north and east sides by Holcus and *Scilla non-scripta*. The entangled grass growth permitted of but few flowering plants, chief of these being the *Ranunculus acc*, *Rumex acetosa*, *R. acetosella*, and *Achillea millefolium*. The

upper soil is a sandy clay ; the sub-soil a heavy clay. This field was ploughed in September, 1939, and the heavy texture of the upturned clods was well pulverised by the severe frosts of 1940. Oats were planted in April, 1940, and the resulting crop was extremely poor, most certainly not commensurate with the cost of labour entailed in the breaking up of the pasture. The outstanding phase was the new vegetation which quickly clothed the ploughed area. The dominant plants were *Fumaria officinalis* L., *Spergula arvensis* L., *Galeopsis speciosa* Mill. (*versicolor* Curt.), *Galeopsis tetrahit* L., *Chenopodium album* L. var. *candicans*, Lam., *Polygonum aviculare* var. *brevifolium* most common form and var. *agrestinum* Jord. in lesser quantity, *Polygonum Persicaria* L., and the ubiquitous *Stellaria media* L. The immensity of these plants made an intermingled wealth of blossom which was most pleasing to the eye. I would emphasise that as regards *Fumaria officinalis* and *Galeopsis speciosa*, both plants are definitely not common plants within the Huddersfield district. *Fumaria officinalis* is occasionally found along the borders of arable cultivation. Here were huge thickets 3 to 4 ft. in height gay with blossom. *Galeopsis speciosa* can be spoken of as rare, indeed the rarest locality to the pasture in question where strong plants do occur annually is distant some two miles. Here upspringing were beds 12 ft. long by 4 ft. wide besides scores of solitary plants scattered throughout the area, all producing a most festive display of flowers. The resulting oat crop was machine cut latter part of August, being hand selected into sheaves. The tedded wild plants were in great swathes, being ultimately fired. Seed production was most prolific, furnishing abundant feasts to the house sparrow, members of the finch tribe, and starlings. The area was reploughed in mid-November.

Observation 2.—This area (distant 1½ miles from Observation 1) has always been a moist rough pasture, the topmost portion rising gradually, and here, until clearance took place in spring, 1940, were several thickets of *Ulex Gallii* Planch. The lower portion due to ill-drainage of the clay subsoil, is most swampy in wet periods. The dominant grass flora was *Festuca ovina*, *F. pratensis*, *Dactylis glomerata*, *Agrostis vulgaris*, the more dry stony slope being controlled by *Deschampsia flexuosa*, *Agrostis vulgaris*, and a little *Triodia decumbens*. The drainage runnels produced *Poa trivalis* and *Alopecurus geniculatus*. The other conspicuous flowering plants were *Ranunculus acer* and *R. repens*, *Senecio Jacobæa* and *S. aquaticus*, *Cirsium palustre*, and *Rumex acetosella*. The ploughing was extended as far as possible up the slope and after a most liberal lime dressing oats were planted. The reclothing with vegetation was distinctly surprising. The oats germinated, but were literally choked at birth by the countless

seedling plants of *Spergula arvensis* L., *Chenopodium album* L. var. *candicans* Lam., *Polygonum Persicaria* L., *Stellaria media* L., the whole a massive area of vegetation which had never previously clothed this pasture. In June this weed crop was hand pulled and scythed to the base of the rising part of the land, the area reharrowed and replanted with green kale ; the kale plants throve extremely well. The portion beyond and up the rising slope remained untouched, and was a jungle growth, *Polygonum Persicaria* and the Chenopods being most pronounced. A partial destruction of this jungle growth took place at 3 a.m. on the morning of August 27th, 1940. A German bomber dropped two H.E. bombs in the field north and co-extensive with the area now being commented upon, leaving one crater 24 ft. in circumference. One of the blast waves taking a southerly direction passed through the weed jungle completely destroying the aerial growth of the plants in an almost even line breadth 7 ft. wide.

I collected seeds of the dominant plants, and a brief description of such seeds is as follows :

Fumaria officinalis L. In colour light brown. Ovate or roundish ovate, rugose. Large shallow depression at the summit.

Spergula arvensis L. In colour black purple. Obovate, naked, tubercled, slight whitish margin encircling the whole seed.

Galeopsis Tetrahit L. In colour light or dark chocolate brown. Broadly ovate, obscurely reticulate. At the narrow end is a depression with distinct rim, and from that depression runs a prominent ridge lengthwise to the broad base of the seed.

G. speciosa Mill. (*versicolor* Curt.). In colour deep brown-black. Obscurely reticulate. Extremely broad ovate. Deep depression at summit, with distinct rim and prominent ridge as in *G. Tetrahit*.

Polygonum aviculare var. *brevifolium* (most common form and var. *agrestinum* Jord. (in lesser quantity). In colour rich deep purple. Broadly ovate, terminating in a blunt point. Shining, smooth, slightly pitted and striated longitudinally. Prominent ridge running lengthwise from point to base. The hilum attachment is prominent.

P. Persicaria L. In colour purple. Flat convex, smooth, shining, tapering to a central narrow neck not unlike an abreviated funnel.

Chenopodium album L. var. *candicans* Lamm. In colour bright purple. Globose and prominently pointed, smooth with occasional dotted depressions.

I have purposely selected these two observations, inasmuch as in No. 1 the reclothing was in part by plants which are

distinctly uncommon in our district, whilst No. 2 displayed the most common form of reclothing locally of newly ploughed land. I would particularly stress that in both these cases there has been no disturbance of the land for upwards of fifty years. The problem is when and how have the abundant seeds of the plants been carried to the areas. Dispersal by wind is doubtless one of the main factors concerning the whole of the plants, but probably not so pronounced in regard to *Galeopsis tetrahit* and *G. speciosa*, whose seeds are of a comparatively heavy type and assumptively are not distant wind dispersed only under moderate gale force. Moreover, from whence came the seeds of *Fumaria officinalis* and *Galeopsis speciosa*, and why was the deposition so marked in parts of the pasture? None of the plants develop any particular attachment or special structure to aid in the dispersal of their seeds. Dispersal by birds cannot be ruled out, for the seeds of *Fumaria* and the two species of *Galeopsis* would readily pass through the alimentary canal of a bird. Another phase requiring attention is how long can and do the seeds of the whole of the plants enumerated retain their vitality? Can, and do they, restrain their germination for lengthy periods until conditions are favourable for the embryonic plant to come to successful growth? In both areas of observation a good depth of dry decaying grass vegetation masked the subsoil, and this, in competition with new grass growth, does not make a habitat ideal for germinating seeds. I have no test guide as yet in regard to the vitality periods of the plants mentioned, and the status of this limitation must not be too readily assumed, but it cannot be thought that the great masses of seedling plants were from very old seed depositions. The ploughing of the land and subsequent husbandry operations would mean that surface materials would lie buried, and the added depth would be detrimental to the majority of any deposited seeds successfully germinating. Further, it cannot be hastily assumed that the whole of the seeds were deposited betwixt ploughing and sowing of the oats. The seedling plants were much more pronounced in their masses than the oats when germination had commenced. Grazing animals and human agency might certainly have aided slightly (if at all) in any dispersal, and it is hard to believe if dispersal assistance in marked degree due to these agencies that man and mammals had traversed areas where the seeds of the *Fumaria* and the two species of *Galeopsis* were already deposited. That the seeds of the whole of the plants were sown with the oats can also be ruled out. Vitality tests would undoubtedly help, and so would overlooked dispersal aids.

Can any fellow nature students assist in the solution of my problem?

1 May 1941

TWO MADEIRAN BIRDS

At a Meeting of the Vertebrate Section of the Yorkshire Naturalists' Union held on October 12th, 1940, Mr. H. B. Booth exhibited the skins of three Spanish sparrows (*Passer hispaniolensis*) from Madeira, two of the skins being those of adult and typical cocks, and the third being that of an immature hen.

The Exhibitor stated that until May, 1935, this bird was unknown in Madeira. At that date, however, following upon nine days of continuous strong easterly winds they were found at various places over the Island. They settled down and nested and have since increased to such an extent that they are fast becoming the commonest resident land bird of the Island. They occur generally in South-West Europe and North-West Africa and are also found in the Canary Islands. This is a very interesting example of the manner in which the fauna of an isolated island may be augmented without the aid of man. Mr. Booth stated that he at first believed this to be the Moroccan House Sparrow, *P. a. tingitanus*, which occurs only in North-West Africa, but that this identification was subsequently corrected by Mr. H. F. Witherby. The differences in plumage between *P. hispaniolensis* and *P. domesticus* were explained by Mr. Booth, who pointed out particularly the differences at the top of the head in the male bird.

Mr. Booth exhibited also the skin of a Lesser or Madeiran Swift (*Apus unicolor*).

This was a faded specimen which had been in the museum at Funchal for many years and had been discarded when the museum obtained a better skin. It has been wrongly identified in the museum as the Common Swift of Europe (*Cypselus apus*) and Mr. Booth was unable to persuade the Curator of the Museum that this identification was incorrect. He accordingly brought away the skin and submitted it to Mr. H. F. Witherby, who confirmed his identification as *A. unicolor*. It nests commonly in Madeira and is supposed to be resident, but Mr. Booth noted that during February and March, which were the only two months during which he was able to make observations in the Island, the numbers greatly increased. In explaining the differences of plumage between *A. unicolor* and *C. apus*, Mr. Booth pointed out particularly that the chin is much less clearly white in colour. He has to thank Mr. J. E. Maul, of the Municipal Museum, Funchal, for the skins.

Ossicles of the starfish, *Metopaster stainforthi* sp. nov., a species illustrated in the *Quarterly Journal of the Geological Society*, Vol. XCVI, Pl. XVII, by Messrs C. W. and E. V. Wright, have been presented to the Geological Gallery in the Hull Museum. They are Topotypes and Metatypes. The form is characteristic of the Quadratus Zone of the chalk of the Sewerby cliffs.—T. S.

SIZE AND PROPORTION CHANGES IN THE SEA URCHIN *ECHINOCORYS* FROM THE CHALK OF YORKSHIRE

JOHN F. HAYWARD, M.Sc.

This paper is the third of a series describing the changes in size and proportions in the Sea Urchin *Echinocorys* in the English Chalk. Each paper deals with a given area, and by comparing the results of the individual areas it is possible to assess geographical as well as time variations.

For the purpose of brevity, it will be assumed that the reader has access to the two previous papers [Hayward (*a*) and (*b*)], and, except for the purpose of indicating one or two changes in technique, the methods adopted in studying the material will not be restated. It is, however, necessary at the present stage to describe these alterations to the method previously adopted.

Hitherto six factors have been considered, the three dimensions (referred to for shortness as L, B, and H) and their ratios (L/B, H/L, and H/B). In examining the results obtained in the districts already studied, however, it was found that

(1) The three dimensions increase and decrease in sympathy with each other.

(2) The ratios Height/Length and Height/Breadth alter in sympathy with each other, but not with the ratio Length/Breadth.

Unless further research proves that these statements have only a limited application, all six factors need not be quoted, but it will be sufficient to make use of three only.

1. Size. Any one of the three dimensions may be used to indicate the changes in size. The length and breadth are more suitable than the height, owing to the greater variability of the latter, and it is proposed to adopt the length for this purpose.

2. Narrowness. This is represented by the ratio Length/Breadth.

3. Steepness. Either of the remaining two ratios may be used to represent Steepness (or the variations in height when compared with the other dimensions) and the ratio Height/Length will be chosen.

From these three the values of the other factors can always be obtained by a simple calculation.

The Use of the Arithmetic Mean

Hitherto the form which has been taken as typical of any horizon is that which has the length, breadth, and height which are most abundant in that horizon. That is to say, it is not the *arithmetic mean* which is quoted, but the *mode*. If all the graphs obtained by plotting the dimensions were

symmetrical, the mean and the mode would coincide, but it has been shewn that this is not so. Most of the graphs are asymmetrical. There is, however, a very definite, though limited, use to which the mean may be put, and in the case of the present investigation, it was made use of in one place.

The circumstances in which this method may be adopted are to be found when the subdivisions of a limited zone or part of a zone are being considered, and the amount of material from each subdivision is comparatively small. It may be safely assumed in many cases that, if it were possible to obtain a very large number of specimens from each horizon, the graphs obtained from each part of the material would be of approximately the same shape. Thus the arithmetic means of the specimens from the various horizons would represent the *relative, but not the actual,* values of the ' typical forms.' Where the horizon is very limited, it may perhaps be assumed that the modes of the individual groups bear the same relationship to the means as the mode of the whole bears to the mean of all the specimens, and in this way it may even be possible to estimate the *actual* dimensions of the typical forms.

Previous Research

A. W. Rowe [1904], in dealing with the Chalk of the Yorkshire coast, made a number of references to *Echinocorys*. In accordance with his usual practice, he recognised certain ' shape-variations ' typical of the various zones, and these forms were described by their size and shape only. They were not based upon statistical research, but were selected on account of their most obvious shape features. In many cases, therefore, they tended to be extreme or striking forms which were not necessarily typical of the majority. Rowe recognised that while some of the Yorkshire ' shape-variations ' approximated to those which he had described from the South of England, they appeared on the whole to be different.

The writer has already expressed some doubt as to the biological, as distinct from the stratigraphical, validity of the method commonly in use of recognising ' varieties,' based largely upon shape. It is true that in one zone in Yorkshire there is a very typical shape tendency which may perhaps be useful for stratigraphical identification, but it must be stressed that any contemporary forms which do not exhibit this tendency cannot be regarded as belonging to a distinct biological group. For that reason no attempt is made in this paper to describe this form.

The late W. C. Ennis [1934] has given an analysis of the genus in Yorkshire, and his work was of a statistical nature. His own collection is in the possession of the Hull Technical College, and I have been given full facilities for examining

it as well as other material to which he had access. In spite of the statistical method adopted, the author did not depart very much from the existing ' variety ' concept, and he recognised six forms, some with a more limited horizonal range than others. The feature on which he relied was the ratio of height to length, and the following table gives a summary of the ' forms ' which he described.

Form	Zones	H/L	Remarks
Normal Form	Hp. to Aq. except Mars.	70–78%	
Southern Form	Hp.	95%	
Small Variety	Top Hp. to base M.ct.	78%	c.f. Normal form but smaller.
Unnamed	Marsupites	64%	Small.
,,	,,	80%	Like the last but higher.
Very large variety	M.ct. and Marsupites	60%	

Material Examined

Whereas the two previous papers in this series were not written until about three thousand specimens of *Echinocorys* had been examined, the Yorkshire material to which I have had access does not amount to more than 270 specimens. It follows that the results obtained are very much less accurate and must be treated with reserve. Except for one small instance, no subzonal divisions have been recognised, and it is consequently impossible to describe changes in the fossil within any zone. One of the zones is very poorly represented. The chief collections examined were the following :

Hull Municipal Museum.

Mortimer Collection. 124 specimens.

Many of the specimens are labelled according to localities only, and many more by reference to the position on the sheets of the Ordnance Maps. For information as to these localities, and the zones represented, I am indebted to Mr. C. W. Wright, who, although no longer in contact with the Museum has given considerable assistance through the medium of the post. He has spent much time in the past in studying the Mortimer material.

Walton Collection. 60 specimens.

General Collections of the Museum. A few specimens.

Hull Technical College.

W. C. Ennis Collection. 24 specimens.

C. W. and E. V. Wright Collection. 43 specimens.

Besides these, some specimens from the British Museum (Natural History) and the Geological Survey Collections were examined. Unfortunately, not more than a few specimens from the A. W. Rowe Collection in the British Museum are

available for study, and it seems probable that the rest of Rowe's Yorkshire material is not yet unpacked.

Zonal Distribution of the Material

The specimens which have been examined were not spread evenly over the five zones represented in this area. The following are the numbers of specimens from each zone : Zone of

Holaster planus. 101 specimens.
Micraster cortestudinarium. 43 specimens.
Micraster coranguinum. 11 specimens.
Marsupites testudinarius. 58 specimens.
Actinocamax quadratus. 57 specimens.

The unfortunate scarcity of material from the central zone makes statistical work on that zone impossible. Some slight indication can, however, be obtained from the few specimens which are available, and it is clear that the general size and proportions are intermediate between those in the zones above and below.

Summary of Results

Figure 1 indicates the changes in size, narrowness, and steepness which took place in the Yorkshire area. The values for each zone are at best approximate. The only qualification to be made to this figure is that, by means of the method indicated on page 110, it was found that there appeared to be some decrease in size in the lower part of the zone of *Holaster planus*. The evidence for this is, however, very slight.

Size. Except for the possible early decrease just mentioned, the size of the urchin in this area is found to increase progressively through the five zones represented. No information is available as to possible fluctuations within any of the zones, but the material from each zone is sufficiently uniform to suggest that such variations, if they existed, were small. As in the other areas which have been studied, the three dimensions did not change in proportion.

Narrowness. Except for a very slight early decrease, this feature increased during the lower zones to a maximum in the zone of *Marsupites*. This agrees with a similar maximum point in the southern district, and the values of the Length/Breadth ratio at the maximum points are approximately equal in the two areas. After this zone there was a decrease.

Steepness. This decreased steadily through the five zones, and therefore decreased with increase in size. Although the Height/Length ratio shewn in Figure 1 had a minimum point in the *Marsupites* zone, the Height/Breadth ratio decreased uniformly. No doubt the discrepancy is due to inadequate material.

Comparison with other Areas

Although the range of zones in Yorkshire is almost as wide as that in Southern England, the detail with which the area has been studied is not so great. In the case of East Anglia it is chiefly the higher zones from which material has been drawn. In spite of these facts, it is possible to make some comparisons between the three areas.

1. In the zone of *Holaster planus* the size agrees approximately in the three areas, though in Yorkshire there may be a slight increase in size as well as in narrowness and steepness.

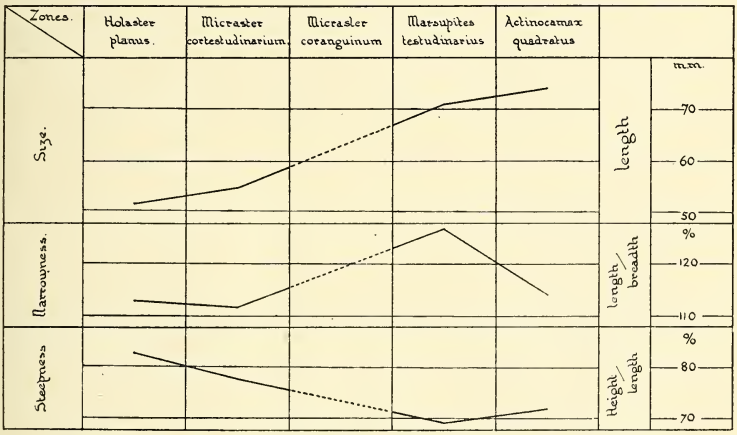

Figure 1. Size and Proportion changes in *Echinocorys* in Yorkshire.

2. So far as can be ascertained in the higher zones, the size is greater in Yorkshire than in East Anglia, and is greater in East Anglia than in Southern England.

3. In the zone of *M. cortestudinarium* the ratio Length/Breadth is less than in Southern England, and in the zone of *Actinocamax*, it is less in Yorkshire than in either of the other two areas.

4. The ratios Height/Length and Height/Breadth are approximately within the range exhibited in the other districts.

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FIELD NOTE

Large Codfish at Scarborough.—On March 4th, 1941, Mr. Tom Pashby, a professional fisherman of the local motor boat *Nellie*, caught while fishing in the Bay with hook and line an unusually large codfish. The fish was a female containing a roe weighing 4 lb. Its length was 3 ft. 11 in., and the weight exactly 56 lb. The fish was sold for £2 6s. to Mr. H. Oldridge, of Bar Street, who kindly gave me one of its vertebrae. An examination of the annual growth rings on this show that the fish was approximately 24 or 25 years old.

This is one of the largest fish of its species caught locally. One of 50 lb. was captured on January 23rd, 1928, and another of 68 lb. on February 21st, 1929. One recorded as being caught at Scarborough in 1775 weighed 78 lb. and measured 5 ft. 8 in. in length and 5 ft. in girth. It was sold for 1/-, which was considered a good price for it in those days.

The record codfish is an American specimen which weighed 160 lb.—W. J. Clarke.

CORRECTION

The Transactions of the Bradford Natural History and Microscopical Society. Report of the Molluscan Section by Fred Booth.

My attention has been drawn to the errors appearing in the April *Naturalist*. In the MS. sent in for publication I have inadvertently put River Ribble for River Aire, and missed out one area. In my original MS. it is as follows :

(1) The drainage of the River Aire from its source to the Leeds City Boundary.
(2) The Yorkshire portion of the Lune drainage.
(3) The drainage of the River Ribble from its source to the Lancashire border.
(4) The drainage of the River Wharfe from its source to its confluence with the River Washburn at Pool, excluding the Washburn Valley.

Elsie M. Morehouse.

NEWS FROM THE MAGAZINES

The Entomologist's Monthly Magazine for December contains ' Critical Notes on some recent synonymy affecting British species of Dolichopodidæ,' by J. E. Collin ; ' Some recent discoveries in the British insect fauna,' by R. B. Benson, K. G. Blair and H. Donisthorpe (with coloured plate and figures of the diptera *Laphria gilva* L., Windsor Forest, and *Chrysopilus lætus* Ztt., Windsor Park, the orthopteron *Conocepnalus fuscus* F., Isle of Wight, the ant *Strongylognathus diveri* Donis., Studland, the sawflies *Arge metallica* Klug., Ireland, and *Tenthredo rossii* Pz., Wicken Fen, and the beetles *Gastrallus lævigatus* Oliv., *Adelocera quercea* Hbst., and *Limoniscus violaceus* all from Windsor) ; ' Results of the Oxford University Biological Expedition to the Cayman Islands, 1938 : Sphingidæ Lep.,' by K. Jordan ; ' The Odonata of the inner and outer Hebrides,' by J. W. H. Harrison and G. H. Harrison, and several shorter notes.

BRITISH CARRION BEETLES

(*Continued from page 72*)

Weather Records and Observations

When the traps were first buried they were baited with pieces of cooked beef and beef fat. This was on January 26th, 1936. It was, perhaps, an inauspicious time to commence a series of records, for the weather previously had been very wet. The low temperature and rapid desiccation of the bait produced no result, and until the end of February, during which month the temperature became still lower, with heavy frosts and later some snow, results were completely negative. In February, 1937, the weather, too, was quite typical ; there were strong gales, snow interspersed with heavy rain, and ground frosts. By then, however, the traps were well established and a number of captures were made. The February of the following year was more clement. It was to a certain extent seasonal, but there were intermittent sunny and quite mild periods. Raw fish tissues were used for bait that month, but very few visitors were attracted.

Records proper may be said to have begun after the first fortnight of March, 1936, by which time the snow had dispersed and the weather generally had ameliorated. Lights replaced the original bait, and, in fact, became the medium used almost exclusively throughout the investigation. The end of March heralded the first *Pterostichus madidus*, an insect which was to become so common later on. Very bad weather occurred during the corresponding month in 1937, when there were frequent snowfalls and ground frosts. On one occasion the western trap was swamped with water, probably because the lid was badly replaced. The *Proteinus* specimens were nearly all clinging to the top of the bait jar and quite a number had succeeded in finding their way in. March, 1938, was on the whole a quite warm month, and this manifested itself, as will be seen, in a more representative series of specimens. Rather interesting was the fact that in this month was the only time when *Omalium rivulare* was taken in some numbers. The proportional rise in the numbers of insects found in the traps for the month of March over the three years, namely, 21 : 48 : 82, is also of interest.

The first fine weather in 1936 occurred in April, and there was a corresponding increase in insects. Showers and violent hailstorms towards the end of the month did not appear to affect their movements. *Proteinus ovalis* became increasingly common and was taken quite regularly until about the end of June and on nearly every occasion the traps were examined. It was in this month, too, that the first *Necrophori* appeared. Dipterous maggots were a source of annoyance. April, 1937, was warmer than the preceding March, although it was very wet. Bright periods were very scarce and but two really sunny days are on record. *P. ovalis* was again much in evidence and

the Silphidæ shewed an increase over those taken the previous year. An interesting *Atheta* species was captured. Two specimens occurred, and though they have not yet been identified with certainty, Mr. P. Harwood, to whom they were sent, stated that the species came very near to one he had separated off from *A. ignobilis* Sharp. April, 1938 was exemplified by very dry weather. It was cold, with a N.E. wind for many days, but there was no rain worth recording at all. The insect life taken was uninteresting and considerably lower in numbers compared with captures over the same period in previous years.

The almost complete disappearance of *P. ovalis* in 1938 is rather significant and is possibly due to climatic conditions, which in their turn affect the drawing power of the bait. The ratio of the Carabidæ to the Staphylinidæ during these late winter and early spring months is interesting. The Silphidæ are nearly constant, though the individual species vary. It would seem, nevertheless, that as Walsh has said, the smaller insects are busy practically throughout the year. *N. humator* itself seems only to be roused during warm sessions, and a sudden fall in temperature is enough to cause its non-appearance. The Cryptophagidæ were the most numerous in the first quarter of 1937, despite, if anything, worse weather. As to whether or not they should be regarded in the nature of accidental visitors seeking shelter rather than a source of food supply is not yet clear. Most significant is the absence of species in February, 1936, and the comparatively interesting list of captures during the same month of the following years. This is possibly accounted for by the fact that by then the traps were well set, for it must not be forgotten that there is a considerable difference in value between freshly placed bait and putrescent carrion *in situ* over some time. It becomes evident that the Carabidæ do not normally function to any large extent during the early months of the year. Such necrophagous activity as is displayed is undertaken principally by the smaller Silphids and Rove Beetles, and if one compares my list of captures with Walsh's, even neglecting the expression of the district, this becomes apparent.

The weather was dull and cold during most of May, 1936, and it was fine only for some days during the middle of the month. The lights were renewed on the 10th. Diptera were few during the first fortnight, but they returned in numbers towards the end of the month. *P. madidus* gave evidence of an increase in numbers. May, 1937, was variable ; the temperature rose and fell considerably, and fine warm days were interrupted by spells of heavy downpours and high winds. May, 1938, too, was on the whole cold, with some very heavy rain in the third week. *Thanatophilus rugosus*, a single specimen, was retaken after nearly two years. The almost complete ab-

sence from the traps of this species is curious in that it was not infrequently found under small corpses lying in exposed places in the district during the course of several years of collecting.

During June, 1936, the weather was variable : the month opened well, but there was a tendency towards dullness ; the temperature remained at a high level throughout. The bait was changed on the last day of the month. The same time in 1937 was not typical. Warm days alternated with distinctly cool ones, and there were frequent heavy rainfalls. The first half of June, 1938, was fine. Thereafter it changed and became wet and dull. *P. madidus* reached its highest peak for the month.

After a fortnight of brilliant weather, July, 1936, became duller and cooler. Fly maggots developed alarmingly and the traps more than once were a seething mass at the bottom. The bait was changed on the 21st. The great increase in the numbers of *P. madidus* will be noted. This was a very good month as regards species and numbers. It was hoped that more Histeridæ would appear, but this did not happen, and, indeed, after August, 1936, they never recurred. July, 1937, began dully and cleared to fine weather which continued till the close of the month, with a very short cooler break towards the end. Dipterous pupæ had meanwhile metamorphosed, and the traps were very full of newly-emerged imagines. Figures and species were disappointing when compared with those of the previous year. The weather in July, 1938, was most untypical until the second half ; it was cool and dull, and downpours were a daily occurrence. After the 16th it became finer and the month ended rather close and dull. Specimens were uninteresting, and the fall in numbers compared with previous years' results was very marked.

The analyses for the summer quarter shew that the Staphylinidæ give place numerically to the Ground Beetles. Silphidæ have doubled themselves and still shew a remarkable constancy. The rapid dwindling in Staphylinidæ both in 1937 and 1938 is noticeable. Most striking of all are, of course, the records for *P. madidus*. The summer is evidently the time for its capture. Normally one does not associate this beetle with carrion, and on finding carcases in the field it is but rarely that one discloses it upon turning the body over. Special conditions such as those under investigation would appear to suit it admirably.

The beginning of August, 1936, was rather cool, with some rain, but after the first week there was a great improvement, and the remainder of the month was the first really long period of hot weather obtained during the year. Dipterous flies were again much to the fore. The *Pterostichi* fought royally, and the bottom of both traps was thick with carapace fragments. This involved a lot of careful fitting together of

the debris so as to estimate the total number of captures. *Carabus*, too, fell a victim in these fights. All the Staphylinidæ, however, were quite safe and very active in their movements. One of the *Necrophori* had also been killed and eaten, but the others had escaped this fate and were safely ensconced inside the bait jar. The Carabidæ (such of them as remained alive) were all in a more or less torpid condition, which may have been due to weakness rather than to the temperature of the traps. August, 1937, was also a fine month, except for one or two short cool periods during the middle. One heavy rainstorm was recorded on the 15th. This, too, was the best month of the year for weather conditions, and the *Pterostichus* records were accordingly high. August, 1938, was variable, and fine periods vied with dull and wet ones. *N. investigator* figures were better than for 1937, and the three *Calathus fuscipes* visitors were the first to be recorded.

The weather changed suddenly at the commencement of September, 1936, and with the lowering of termperature came a strong fall in numbers, especially with the *Pterostichus* group. *Nebria* began to reappear after an absence of several months. Conditions improved slightly for a few days after the 9th, but the remainder of the month was very wet and unpleasant. September, 1937, was on the whole a fine month. The weather was generally temperate ; later on there were thin frosts which cleared by midday. The bait was renewed on the 19th after having remained in the jars from the previous November. Throughout this extraordinarily long period, including the summer months, it kept admirably well, and was by no means liquefied when the jars were emptied. Nevertheless, had it been changed more frequently it is possible that different data would have been obtained, for there is quite an appreciable decrease in numbers over the corresponding summer months of the previous year. September, 1938, was extremely bad, and there were only two fine days in the whole month. Insect species were scarce and their numbers few as a result.

October, 1936, was fine at first. The weather became worse later on, with morning frosts and showers on the milder days. Very few diptera were observed, although their maggots were still regularly present in the carrion. Following the reduction of temperature which set in during the previous month, the bait kept in a much better state of preservation. The coolness of the traps and the fact that far fewer Diptera were inclined to lay their eggs therein probably accounted for this. On the other hand the odour emanating from the bait was certainly less strong, and this perhaps was a reason for its less attractive powers. During the summer months the stench rising from the traps is often quite overpowering when once one is within a short distance from them, and so soon as

the protective covering is removed and the bait jar taken out and laid aside while the trap itself is being cleared, a host of flies descends upon it in a moment. To a carrion insect, then, the lure of the bait must be very powerful and capable of attracting them from great distances—one will recall Eltringham's[1] remarks on the subject. So long as this state persists the efficacy of the trap can in no way be impaired, and summer-time records should naturally repeat themselves each year. A sudden drop in temperature, leading to marked refrigeration of the carrion tissues, will obviously result in a retarding of the decomposition processes. This being so, the putrescent odour will naturally wane, and with it the enticing properties of the trap. It must be remembered, nevertheless, that a number of katabolic reactions are in operation whilst insect larvæ are present in the bait—always provided that the state of the temperature is not affecting their activities : loss in putrefaction due to climatic preservation should in this event be balanced, at any rate to some extent, thereby assisting the diffusion of the odour and permitting the trap to retain its decoying powers. Thus thermal interference must not be regarded as conclusive proof of the trap's detraction in strength.

The condition of the bait in the two traps afforded good reasons for comparison. The lights in the western trap began to shew very clearly the effect of the slightly damper state which always prevailed there. It was fast blackening and the odour was diminishing—in fact, there were distinct signs of a transformation into humus, and as such its lure was inevitably less appealing to necrophagous beetles. The carrion in the other trap, however, remained very juicy and red. The practical result of these influences was that the number of captures from the eastern trap overhauled those from the other. The smaller species, *Catops* and *Omalium* (which returned after a prolonged absence), were in a semi-torpid state and hidden in the folds of the gauze covering the bait jar.

The month of October, 1937, was a singularly dry one almost to the end. The weather was fine, although morning fogs which lifted by midday were common. The first heavy rains for weeks fell towards the end of the month. An unfortunate accident marred one record for this period : during the normal breaking-up of the beds in preparation for the winter the eastern trap was smashed by the gardener's spade, only the bait jar remaining intact. As a result the trap was filled with earth and only one *Pterostichus* was rescued. The trap was, of course, replaced. It was wet and cold in October, 1938, with strong gales. Towards the end of the month it became rather milder. Morning fogs were common. The bait

[1] See Bibliography.

was changed for lights once more. The fish previously in use was liquescent and was no longer so strongly odorous.

There is little comment to make upon the autumnal season, save that in both 1936 and 1937 the Silphidæ at last succeeded in overtaking the Staphylinidæ, a fact made all the more remarkable because the former were only represented by comparatively few genera. The single *Catops* species in 1937 and 1938 compare very unfavourably with the 1936 records.

In November, 1936, the weather was most wintry. The temperature remained low despite a few brighter intervals. Heavy rain and gales characterised the first week and the remainder were usually foggy. The bait was changed near the end of the month. Diptera still occurred sparingly. It remined dry until November 19th, 1937, when the first sleet fell. After this date rain, sunshine, and fog were typical; the temperature on the whole was moderate. The interior of the traps was noticeably cold. A few diptera were present. The beginning of November, 1938, was unpleasantly cold and wet. It became warmer later on, with morning fogs dispersed by sunshine during the course of the day. Diptera and larvæ were more numerous than in previous years.

The first half of December, 1936, was very cold indeed, and quite a heavy snowfall occurred early on. Conditions improved slightly during the third week, but thereafter it became cold again, and there was sleet and occasional short snowstorms. Early in December, 1937, there was a heavy and prolonged fall of snow which remained on the ground for nearly three weeks. The traps kept singularly dry throughout this bad period. Conditions were even worse in December, 1938. Arctic winds were followed by recurring snowfalls until

Analysis of Carrion Trap Captures	**1936-1937**													
	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total	Feb.
CARABIDÆ.														
Carabus violaceus Linn. v. *sollicitans* Hampe								1					1	
C. monilis Fabr.						1							1	
Nebria brevicollis Fabr.		2						6	5			1	14	
Ophonus pubescens Muell.														
Harpalus æneus Fabr.					1								1	
Pterostichus madidus Fabr.		6	17	31	102	526	549	85	42	14	2		1374	
P. niger Schall.						1	1						2	
P. vulgaris Linn.					5	15	45	7					72	
P. strenuus Panz.		1											1	
Calathus fuscipes Goeze														
Læmostenus terricola Herbst								1					1	
Agonum dorsalis Pont.														
A. mulleri Herbst														
Trechus 4-striatus Schrank									1				1	
Patrobus excavatus Payk.							1						1	
Total		9	17	31	108	543	596	100	48	14	2	1	1469	
HYDROPHILIDÆ.														
Megasternum boletophagum Marsh.														
Total						1							1	

there was a foot of snow on the ground. The traps were empty except for a single spider and a centipede.

January, 1937, was fairly cold and wet, but on the whole it was milder than in the previous December, and the frosts were less noticeable. A growth of mould had formed round the lip of the bait jar in the western trap. The beginning of the month of January, 1938, was seasonable ; there were, of course, frosts, but the weather was quite sunny. Very high and violent gales prevailed during the latter half of the month, especially at night-time. Heavy rains were often followed by periods of bright sunshine. The temperature remained low throughout. January, 1939, was typically wintry, and the heavy December snows remained, aided by bright sunshine and very hard frosts. Life in the traps was limited to a spider, an earwig, a centipede, a slug, and a coleopterous larva, probably that of a ground beetle.

It became increasingly evident from the figures for the winter season that necrophagous activity was curtailed to a minimum, and that such work as was undertaken was done principally by the Staphylinidæ. The steady drop in numbers of *P. madidus* during the cold weather is noticeable.

Appended is the complete analytical list of coleoptera taken during the periods 1936-37, 1937-38, and 1938-39. It is, as has been stated previously, divided into calendar months, and the species totals, family totals, and grand totals are indicated in their appropriate places. Two graphs are also attached. The first shows the monthly occurrence of *Pterostichus madidus* Fabr. and demonstrates very clearly the remarks made about this beetle ; the other shows the monthly occurrence of the coleoptera collected from the trap as a whole.

1937-1938								1938-1939														
July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total	Grand Total
		2					2														3
												3								3	4
		26	1				31			2		2	1		1	4	1			11	56
													1							1	1
																					1
451	395	208	39	10		1	1223	1	11	18	65	128	148	219	32	33	18			673	3270
4	5	4					14					3	13	10		1				27	43
25	33	18					85				1	4	13	27	7	1	1			54	211
							1														2
														3						3	3
		1					1		1											1	3
											1									1	1
									1											1	1
																					1
																					1
480	433	259	40	10		1	1357	1	13	20	67	140	176	259	40	39	20			775	3601
																					1

was changed for lights once more. The fish previously in use was liquescent and was no longer so strongly odorous.

There is little comment to make upon the autumnal season, save that in both 1936 and 1937 the Silphidæ at last succeeded in overtaking the Staphylinidæ, a fact made all the more remarkable because the former were only represented by comparatively few genera. The single *Catops* species in 1937 and 1938 compare very unfavourably with the 1936 records.

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there was a foot of snow on the ground. The traps were empty except for a single spider and a centipede.

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Analysis of Carrion Trap Captures

	1936-1937													1937-1938													1938-1939													
	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total	Feb.	Mar.	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total	Grand Total
CARABIDÆ.																																							
Carabus violaceus Linn. v. *sollicitans* Hampe									1				1						2					2															3
C. monilis Fabr.																																							3
Nebria brevicollis Fabr.		2				1							1	4					26	1				31			2		2	1		1	4			3	4	56
Ophonus pubescens Muell.								6	5			1	14																	1						11	56
Harpalus æneus Fabr.																																				1	1	1
Pterostichus madidus Fabr.		6	17	31	102	526	549	85	42	14	2		1374	66	451	395	208	39	10		1	1223	1	11	18	65	128	148	219	32	33	18				673	3270
P. niger Schall.					1								1	1	4	5	4					14					3	13	10		1					27	43
P. vulgaris Linn.							1						2	8	25	33	18					85				1	4	13	27	7	1	1				54	211
P. strenuus Panz.		1			5	15	45	7					72									1															2
Calathus fuscipes Goeze													1																3							3	3
Læmostenus terricola Herbst																			1			1		1		1										1	3
Agonum dorsalis Pont.								1					1																								1	1
A. mulleri Herbst																											1									1	1
Trechus 4-striatus Schrank																										1										1	1
Patrobus excavatus Payk.									1				1																								1	1
Total		9	17	31	108	543	596	100	48	14	2	1	1469	79	480	433	259	40	10		1	1357	1	13	20	67	140	176	259	40	39	20				775	3601
HYDROPHILIDÆ.																																							
Megasternum boletophagum Marsh.						1							1																									1
Total																																						

Analysis of Carrion Trap Captures (*continued*)

	1936-1937														
	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total	Feb.	Mar.
STAPHYLINIDÆ.															
Aleochara curtula Goeze						4	4						8		
A. lanuginosa Grav.					1								1		
A. diversa Sahlbg.			1										1		
A. sparsa Heer						1	1						2		
A. bipustulata Linn.														1	
Aleochara sp.*															
Atheta angusticollis Thoms.						2							2	1	1
A. crassicornis Fabr.						20	18						38		
A. inoptata Sharp															
A. trinotata Kraatz															
A. aquatica Thoms.														1	
A. zosteræ Thoms.						2							2		1
A. fungi Grav.									1	1			2		
Atheta sp.†															
Tachyporus pusillus Grav.															
T. nitidulus Fabr.															
Tachinus rufipes Degeer									1				1		
T. subterraneus Linn.		5	6							9	3	22	45	2	4
Mycetoporus rufescens Steph.															1
Quedius mesomelinus Marsh.		1	2	6	1	2			2			1	15		1
Q. cinctus Payk.						1							1		
Quedius sp.*			1				1						2		
Creophilus maxillosus Linn.								1					1		
Staphylinus globulifer Fourcr.								1					1		
Philonthus chalceus Steph.			1	1		1	2	2	1				8		
P. carbonarius Gyll.															
P. marginatus Stroem										1			1		
P. cephalotes Grav.			4		1	3	1						9		
Oxytelus sculpturatus Grav.										3		1	4	1	1
Omalium rivulare Payk.		1	4							7		1	13	1	7
Proteinus ovalis Steph.		3	80	27	1			1	3	2			117	3	5
P. brachypterus Fabr.															
Staphylinidæ sp.*						1	2						3		
Total		10	99	34	4	37	29	5	8	23	3	25	277	10	1
SILPHIDÆ.															
Necrophorus humator Goeze			7	11	2		8	18	3				49		
P. investigator Zett.							5	1					6		
Thanatophilus rugosus Linn.					1								1		
Catops fuliginosus Erichs.		1						4	6	16	2	4	33	1	2
Sciodrepa watsoni Spence					1	8	12	3		2			26		
Ptomaphagus subvillosus Goeze			1				1						2		
P. subvillosus Goeze v. *sericatus* Chaud.															
Total		1	8	11	4	8	26	26	9	18	2	4	117	1	2
HISTERIDÆ.															
Hister striola Sahlbg.					1	2	1						4		
Gnathoncus punctulatus Thoms.					1								1		
Saprinus semistriata Scriba.							1						1		
Total					2	2	2						6		
NITIDULIDÆ.															
Omosita discoidea Fabr.		1											1		
Rhizophagus perforatus Erichs.															
Total		1											1		
LATHRIDIIDÆ.															
Coninomus nodifer Westw. Total						1							1		
CRYPTOPHAGIDÆ.															
Cryptophagus umbratus Erichs.			2							2			4		
C. badius Sturm.															
C. affinis Sturm.				1						2			3		
Atomaria linearis Steph.						1							1		
Total			2	1		1				4			8		
BYRRHIDÆ.															
Simplocaria semistriata Fabr.															
Total							1						1		
CURCULIONIDÆ.															
Otiorrhynchus singularis Linn.							1						1		
O. sulcatus Fabr.							1						1		
Total							2						2		
Grand Total		21	126	77	118	593	656	131	65	59	7	30	1883	11	

* Escaped.
† Unidentified.

1937-1938									1938-1939															
July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total	Grand Total
3							3				1									1	12
																					1
																					1
																					2
							1														1
	1						1					1								1	2
							2														4
1	1						2				1									1	41
									1				2							3	3
											1									1	1
							1														1
							2														4
									1							1				2	4
							2														2
																1				1	1
1							1														1
									1											1	2
				1	5	21	33	2								1				3	81
							1														1
				1			2														17
																					1
																					2
																					1
																					1
2			1				3														11
	1						1														1
																					1
	1					1	2		1	1		2								4	15
						2	4														8
1			2	1	2		14		38	1										39	66
			5				91		19	1						1				21	229
									1											1	1
	1		1				2														5
8	4	1	1	8	3	7	24	168	2	62	3	3	3	2			4			79	524
							4														
2	4	1	2				17		1	3	6	4	2	1						17	53
	1	1					2				1		4							5	40
							6				1									1	8
1				1	1	2	2	9		2						1	3			6	40
1	3			8	9			24		2				1	2		1			6	41
																					32
										2	1	4	1							8	8
4	8	2	2	9	10	2	2	62		7	4	12	5	7	3		1	4		43	222
																					4
																					1
																					1
																					6
																					1
												1								1	1
												1								1	2
												1								1	2
							6														10
							1														1
																					3
							2														3
							9														17
																					1
			1				1						1							1	2
																					2
			1				1						1							1	4
492	436	263	57	23	9	27	1597	3	82	27	82	150	186	262	40	44	24			900	4380

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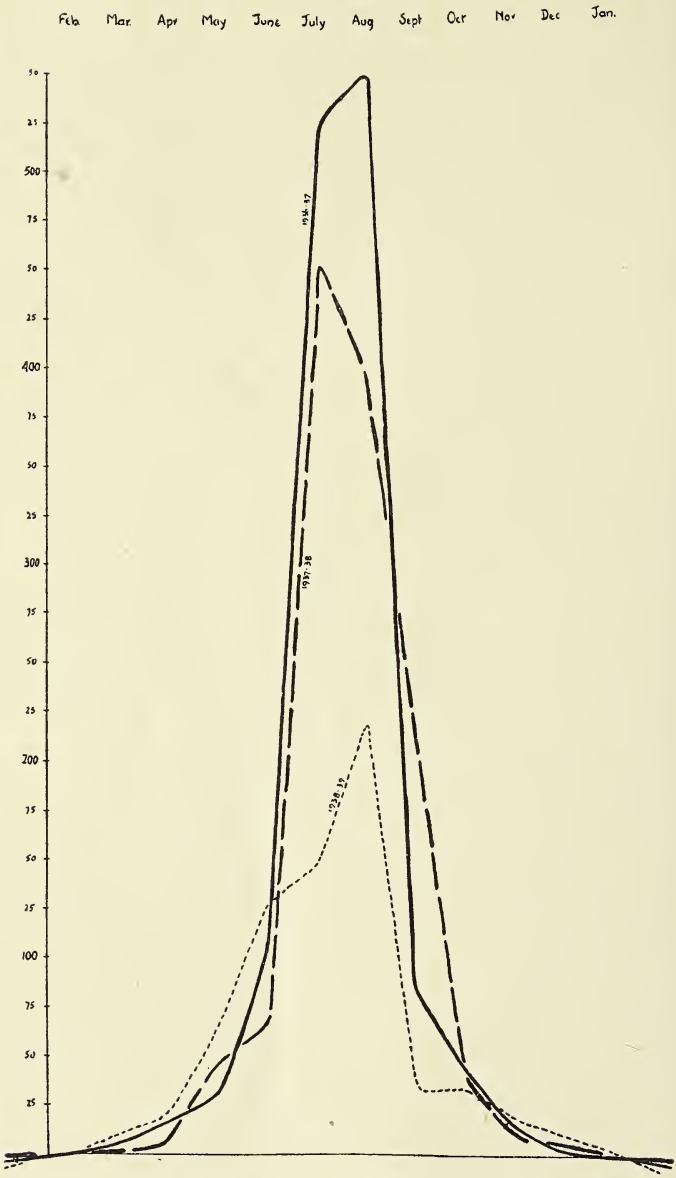
Analysis of Carrion Trap Captures (*continued*)

	1936-1937													1937-1938													1938-1939														
	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total	Grand Total
STAPHYLINIDÆ.																																							
Aleochara curtula Goeze						4	4						8													3			1									1	12
A. lanuginosa Grav.					1								1																										1
A. diversa Sahlbg.			1										1																										2
A. sparsa Heer						1	1						2																										1
A. bipustulata Linn.																										1												1	2
Aleochara sp.*																										1				1									4
Atheta angusticollis Thoms.						2							2													2												1	41
A. crassicornis Fabr.						20	18						38													2			1									3	3
A. inoptata Sharp																													1									1	1
A. trinotata Kraatz																																							1
A. aquatica Thoms.																										1													4
A. zosteræ Thoms.						2							2													2		1							1			2	4
A. fungi Grav.									1	1			2													2		1											3
Atheta sp.†																										2									1			1	1
Tachyporus pusillus Grav.																																							1
T. nitidulus Fabr.									1				1													1		1										1	2
Tachinus rufipes Degeer										9	3	22	45								1	5	21		33	2								1				3	81
T. subterraneus Linn.		5	6																						1													1
Mycetoporus rufescens Steph.																										2													17
Quedius mesomelinus Marsh.		1	2	6	1	2			2			1	15									1			2													1
Q. cinctus Payk.						1							1																									2
Quedius sp.*			1				1						2																									1
Creophilus maxillosus Linn.								1					1																									1
Staphylinus globulifer Fourcr.								1					1																									11
Philonthus chalceus Steph.			1	1		1	2	2	1				8									1			3													1
P. carbonarius Gyll.																									1													1
P. marginatus Stroem									1				1																								4	15
P. cephalotes Grav.			4		1	3	1						9									2	1		2		1	1		2								8
Oxytelus sculpturatus Grav.										3		1	4									2			4		38	1										39	66
Omalium rivulare Payk.		1	4							7		1	13									2	1	2	14		19	1										21	229
Proteinus ovalis Steph.		3	80	27	1			1	3	2			117									5			91		1										1	1
P. brachypterus Fabr.																																							5
Staphylinidæ sp.*						1	2						3						1		1				2														
Total		10	99	34	4	37	29	5	8	23	3	25	277	10	4	3	4	1	1	8	3	7	24	168	2	62	3	3	3	2			4				79	524
SILPHIDÆ.																																							
Necrophorus humator Goeze.			7	11	2		8	18	3				49												4												17	53
P. investigator Zett.							5	1					6	2	4	1	2								17		1	3	6	4	2	1						5	40
Thanatophilus rugosus Linn.					1								1		1	1									2				1	4							1	8
Catops fuliginosus Erichs.		1						4	6	16	2	4	33	1	2										6				1								6	40
Sciodrepa watsoni Spence					1	8	12	3		2			26	1				1	1	2	2				9		2						1	3			6	41
Ptomaphagus subvillosus Goeze			1				1						2		3			8	9						24		2				1	2					32
P. subvillosus Goeze v. *sericatus* Chaud.																											2	1	4	1							8	8
Total		1	8	11	4	8	26	26	9	18	2	4	117	1	2	1	2	1	1	2	2	2	2	62		7	4	12	5	7	3		1	4			43	222
HISTERIDÆ.																																							
Hister striola Sahlbg.					1	2	1						4																										4
Gnathoncus punctulatus Thoms.					1								1																										1
Saprinus semistriata Scriba.							1						1																										1
Total					2	2	2						6																										6
NITIDULIDÆ.																																							
Omosita discoidea Fabr.		1											1																										1
Rhizophagus perforatus Erichs.																														1							1	1
Total		1											1																	1							1	2
LATHRIDIIDÆ.																																							
Corticus unicolor Westw. Total						1							1																	1							1	2
CRYPTOPHAGIDÆ.																																							
Cryptophagus umbratus Erichs.			2							2			4													6													10
C. badius Sturm.																										1													1
C. affinis Sturm.				1						2			3																									3
Atomaria linearis Steph.						1							1													2													3
Total			2	1		1				4			8		4											9													17
BYRRHIDÆ.																																							
Simplocaria semistriata Fabr. Total							1						1																										1
CURCULIONIDÆ.																																							
Otiorrhynchus singularis Linn.							1						1																								1	2
O. sulcatus Fabr.							1						1																									2
Total							2						2									1			1					1							1	4
Grand Total		21	126	77	118	593	656	131	65	59	7	30	1883	11	48	20	492	436	263	57	23	9	27	1597	3	82	27	82	150	186	262	40	44	24			900	4380

* Escaped,
† Unidentified.



Graph showing the Monthly Occurrence of *Pterostichus madidus*, Fabr.

(*To be continued*)

JUNE, 1941 No. 791

The NATURALIST

A MONTHLY ILLUSTRATED JOURNAL

PRINCIPALLY FOR THE NORTH OF ENGLAND

Edited by

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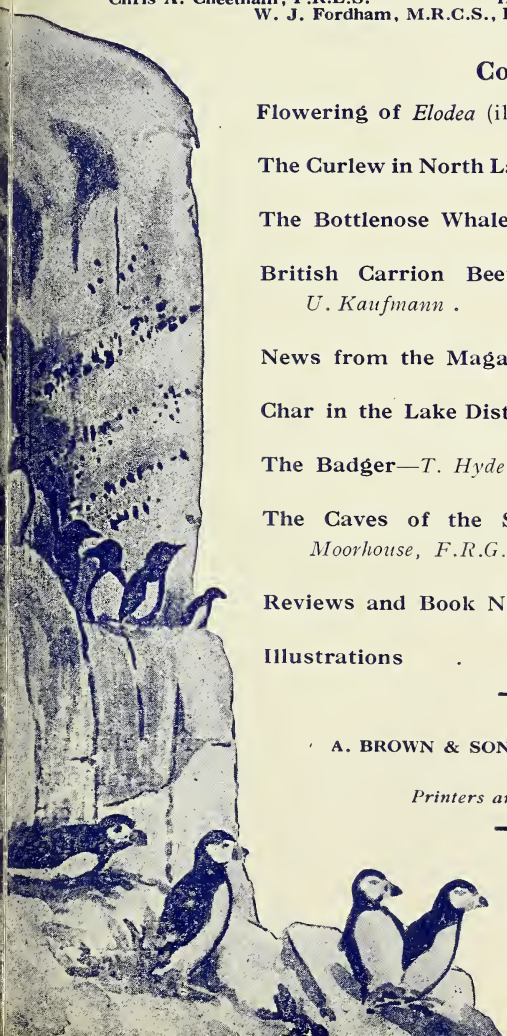

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YORKSHIRE NATURALISTS' UNION

ENTOMOLOGICAL SECTION

OWING to present conditions the Field Meeting arranged for Tanfield has had to be cancelled, and Aberford substituted. The area to be worked comprises Hayton Wood and Hazel Wood, and lies north east of Aberford.

Headquarters are at the Swan Hotel, Aberford, from which the party will set out at 1 p.m.

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Members and associates of the Union, whether geologists or not, are asked to report immediately to the undersigned all cases of new sections or borings occurring in their districts. These records are of vital importance to the progress of geology in the county.

J. A. BUTTERFIELD, M.Sc., F.G.S. (*Secretary*),
32 Ashfield Drive, Frizinghall, BRADFORD.

FLOWERING OF *ELODEA*

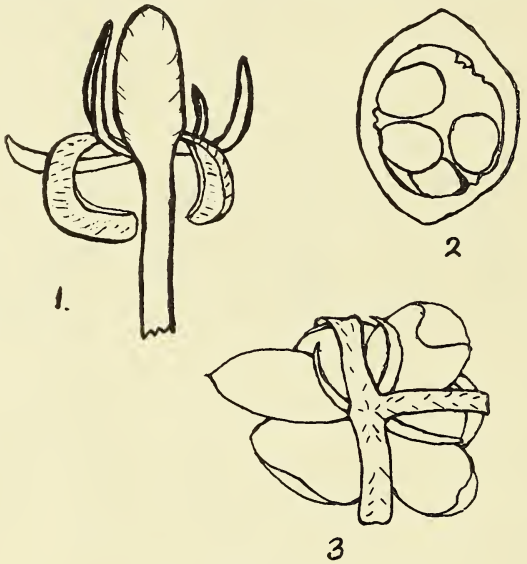
A. MALINS SMITH

On July 26th, 1939, I found *Elodea canadensis* Michx. in full flower in a pond at Yeadon. The flowers were all female. In my experience, which has included special research work with *Elodea* the flowering is a very rare occurrence. In fact this is the only time I have seen the flowers. I find that the records of previous flowering of *Elodea* are vague. Lees'

West Riding Flora says : ' Female flowers only found as yet in West Yorkshire, June-July.' No places or dates are given. The supplement to the flora states ' Both sexes of flowers have now been found—though I think no ripened fruits.' No localities are given, though the finding of male flowers is an occurrence so rare that it should certainly have been supported by place and date. I visited the pond again on August 30th and the *Elodea* was still flowering abundantly. As details and figures of the flowering are not readily accessible I add notes on certain points of structure and biology.

JUN 25 1941

The flower has a long slender perianth tube about the length of which authorities differ. Bentham and Hooker and Babington say it is 2 to 3 in. long. Hooker (*Students' Flora*) says 4 to 8 in., while Wylie quoted by Arber (*Water Plants*) says it may reach 12 in. The longest tube in my specimens was $6\frac{1}{2}$ in. and there were several 5 to 6 in. long. My photograph shows these perianth tubes attached to the leafy stem



1. Elodea flower, side view
3. do. do., from above
2 T.S. ovary

and the two-lobed spathe is seen toward the base of some of these. It seems to be generally thought that the perianth tubes have the function of raising the flower to the surface of the water and it has been deduced that the perianth tube varies in length according to the depth of the shoot from which it grows. The perianth tubes I observed were stretched horizontally along the surface of the water throughout their length or the greater part of it, all the shoots producing them being at only a short distance below the surface of the water. There had been no recent fall of the water to produce this condition. Indeed all the evidence at the pond edges pointed to a recent rise if any change had occurred at all. All these

tubes then, short or long, were much longer than needed to reach the surface, and were not erect, but lying along the water. The terminal portion of the flower at the end of the perianth tube has 3 sepals, 3 petals, 3 staminodes and 3 stigmas. These are all clearly shown in my drawing No. 3. The sepals and perianth tube were tinged with red, the petals white and the stigmas red and hairy. In spite of the red tinge the flowers were inconspicuous, being of very small size, $\frac{1}{5}$ in.

The method of pollination is said to be (Wylie, 1904) as follows: 'The solitary male flowers are detached under water and shoot to the surface, where they burst scattering pollen on the water which then drifts to the stigmas.' After examining my specimens I am of opinion that accounts so far given do not emphasise sufficiently the importance of the position of the stigmas. These are strongly curved downwards as is shown in my drawing No. 1. It thus comes about that whatever position the flower may take from erect to horizontal, the stigmas, curving down into the water and thus being free from obstruction by petals and sepals, are always ready to receive any pollen floating on the water. In addition they are for their size broad and are tumid and hairy so that they offer an efficient receptive surface for floating pollen grains. There thus seems to be no need for Wylie's rather wild suggestion that the pollen is carried to the receptive surface by currents due to some secretion of the stigmas. This important decurved position of the stigmas is not shown in the illustrations to Bentham and Hooker's *British Flora*, where the stigmas are shown curving upwards. It is possible that this is correct for a flower just opening, but all the mature flowers I saw were alike in having the stigmas curved downwards. I saw no evidence to support the remark in Hooker's *Students' Flora* that the *petals* are recurved. The pollination, of course, does not occur in this country where the male flowers have only once been found. I add a drawing, No. 2, showing a transverse section of the ovary with three parietal placentas, one of which at this point has no seeds.

NEWS FROM THE MAGAZINES

The Entomologists' Monthly Magazine for February contains 'Notes on British fungus gnats (Dipt. Mycetophilidæ),' by F. W. Edwards (*Mycomyia tumida* Yorkshire, *M. prominens*, Buckden, Yorkshire, Cumberland); 'A contribution towards the list of aquatic Coleoptera of Hertfordshire,' by R. R. U. Kaufmann; '*Lordomyrma niger* sp. n. (Hym. Formicidæ) with key and notes on the genus,' by H. Donisthorpe; 'The history of *Cicadetta montana* Scop. in Britain, 1812-1940,' by C. Morley and several shorter notes.

THE CURLEW IN NORTH LANCASHIRE

SYDNEY MOORHOUSE

THE choice of the Curlew (*numenius a arquata*) for selected study by the British Trust for Ornithology during 1940 is one of special interest to North Country ornithologists, for the status of this bird in Yorkshire and Lancashire has undergone considerable changes during the past two or three decades, and its breeding range has greatly increased.

The shores of Morecambe Bay have long been known as a winter haunt of the birds, and here migrants from the moors of the Pennines and other North Country breeding grounds congregate in large companies right from the middle of July until the beginning of March. The curlew nests, however, on the heights of Bowland Forest, North Lancashire and Westmorland, all within easy reach of the Bay, so that the birds can be seen feeding on the mud flats throughout the year. Indeed, there is hardly a month when I have not observed one or more curlews off the Bolton-le-Sands shore.

A severe spell of weather, however, sends many curlews across the Irish Sea to the milder climes of Eire, but even during the severe frosts of the early part of the current year I saw many of them on the flats adjoining the Bay.

It would seem that early pairing actually takes place here, for observers have noticed that the earliest arrivals at the inland moors are in pairs—Messrs. Battersby and Oakes (*Birds of East Lancashire*) recording arrivals of pairs on Pendle about March 10th—although small flocks are following within a few days time.

The return to the shores commences about the beginning of July and throughout that month and August small flocks numbering ten to twelve birds are arriving at the seaboard. A certain amount of nocturnal migration takes place, and when engaged on Home Guard duties on a hill top situated in the direct line of flight I heard several flocks passing overhead after darkness had set in.

During the winter roosting takes place at high tide, and I have frequently heard the birds as they have passed over my house at night time on their way to the saltings at the ebb tide.

The North Lancashire and South Westmorland breeding grounds of the curlew might be summarised as follows :

Place	*Altitude ft.*	*No. of breeding pairs (approx.)*	*Place*	*Altitude ft.*	*No. of breeding pairs (approx.)*
North Lancashire—					
Clougha Pike	1,000-1,200	30	Capernwray	350-400	5
Harris End Fell	900-1,000	15-20	Scorton Moor	400	12
Grisedale Fell	900-1,000	15-20	Aughton	300	4
Littledale	800- 900	10-15	Oakenclough	900-1,000	10
South Westmorland—					
Foulshaw Moss	Sea level	5	Whitbarrow Scar	400	3

THE BOTTLENOSE WHALE

R. W. GRAY

THE Bottlenose Whale, *Hyperodon rostratus*, is one of the 'beaked' or *Xiphoid* whales. It is a relative of the Sperm Whale, a cetacean which it resembles in a good many respects.

SIZE, ETC.

The adult males are odd-looking animals having cylindrical, flat-fronted, whitish heads, and a whitish ring round their necks. Our men called them 'flat heads' and 'johns,' the latter term referring to their venerable appearance. They are larger than the females, reaching a length of 30 ft. and a girth of 20 ft. A big one yields three or four tons of blubber, which in turn yields two or three tons of oil and two or three hundredweights of spermaceti. They have one or two pairs of small teeth in the lower jaw, which, however, do not seem to serve any useful purpose. In both sexes there are a couple of grooves or infoldings of the skin in the region of the throat, doubtless to facilitate expansion when swallowing. At birth the Bottlenose is 10 or 11 ft. in length and a girth of about 5 ft. It probably grows to a length of nearly 20 ft. by the time it is weaned.

HABITS

Like other toothed cetaceans, the Bottlenose is gregarious, occurring in small schools or herds numbering six or eight individuals. It is a native of the North Atlantic, visiting the Greenland Sea and Davis Strait in the spring and summer months. It has no objection to ice-cold water, and in April and May, and even in March, is seen quite near the ice-edge. Where it occurs the sea frequently has a brown or green colour owing to the presence of Diatoms. These microscopic algae not only discolour the sea but adhere to the skins of the whales, giving them a brownish colour. The Bottlenose feeds on small cuttle-fish or squid, particularly on the *Gonatus fabricii*, a Cephalopod which appears to be very abundant in certain parts of the Greenland Sea. At what depth it finds its food is unknown, but the depth is not necessarily great because the squid are sometimes seen near the surface.

DISPOSITION

The Bottlenose is an unsuspecting creature and is often in a playful and inquisitive mood. When the sound of a ship's propeller reaches a herd, they very often hasten towards it, apparently bent on ascertaining the cause of the unusual disturbance, at the same time evincing their excitement by

striking the water with their tails and even by jumping out of it. Arrived at the ship, which in the meantime has stopped, they swim round it and under it, and frequently giving their enemies a chance of a shot. Their curiosity satisfied or their surplus energy exhausted, they either give up the diversion and disappear or they lie at the surface at no great distance from the ship as if it were a big and friendly brother. On such occasions they can be approached, and it was usual for a boat to steal round the bow or stern and harpoon the biggest one. Another trait in their character which we exploited is their unwillingness to desert a stricken comrade, and sometimes two or three members of the same herd were captured.

Enemies

The Bottlenose does not appear to be attacked by the Killer Whale or Grampus ; at any rate, those we killed were without wounds or scars attributable to their bites.

Capture

When the Bottlenose is ' struck ' it immediately descends and takes out line very quickly, apparently soon reaching a great depth. A big one takes out about 500 fathoms of line and remains under water about an hour. When it reappears it is easily struck a second time and despatched with a lance.

Although the *Chieftain*, of Kirkcaldy, killed 28 Bottlenose Whales in Davis Straits about 1850, the animal for long escaped the serious attention of the whalers. Their interest in it may be said to date from the year 1877, when the oil of ten killed near Iceland by the Peterhead whaler *Jan Mayen* found a ready market and realised a good price.

My father commenced catching Bottlenose whales in 1880, capturing thirty-two that season and thirty-nine the following one. Devoting more time to them in 1882, he caught 203, and in 1883, 157.

In 1882 my father made most of his captures in May and June in ' bights ' or bays in the margin of the pack-ice, a degree or two to the southward of Jan Mayen. His best days catch was fifteen. A large hoary-headed male which died under water was lost when being hauled up, and when only 50 fathoms from the surface. Many were missed, and a number were lost owing to the harpoon or the line or foregoer breaking. In one remarkable instance, however, this was not so owing to the shot causing instant death and not allowing the animal time to leave the surface, its body consequently floating and being easily retrieved. My father twice cut a mature foetus out of a pregnant female, and in June he observed a number of females accompanied by calves.

In 1883 (my first voyage), as already stated, my father's ship caught 157 whales. The ice did not extend so far to the east as in the previous season. Consequently the fishing was conducted at a greater distance from its edge. Jan Mayen, the nearest land, was sometimes in sight, but usually it was either too far away or hidden by cloud or fog. Very often there was a swell which made the ship's bell toll in a mournful manner and made the work of flensing the whales and hoisting up the boats difficult and even dangerous. In May we experienced a gale from the North-west and were driven far to the South-east. Later in the season, however, the weather was sometimes very fine, the sea looking like a sheet of glass or polished silver. Fog was our greatest enemy, and when there were signs of it the ' bucket ' or signal to return was quickly hoisted. The following year a disaster arising from this cause occurred, the *Chieftain* of Dundee being the vessel involved. In April and May the Bottlenosing was a cold job for the men in the boats, especially when towing behind the ship when she was steaming to windward in search of more victims.

An old male we caught had *Cirripeds*, or stalked barnacles, attached to its teeth, and a calf which we hoisted on deck was 17 or 18 ft. in length and probably weighed three or four tons. One was shot from off the ship. It was a calm, foggy night, and perhaps the unfortunate cetacean thought the vicinity of the ship a good place in which to have forty winks. One which we lost we afterwards found floating dead. It was in a swollen and decomposing condition. There were many birds and a number of sharks about it.

The Norwegians

Although the Peterhead ships were the first to capture the Bottlenose, the business soon fell into the hands of the Norwegians. This resulted from the oil falling in value coupled with the fact that the Norwegians were able to catch them more cheaply than we could. There were several reasons for this : firstly, they were unhampered by the British Board of Trade ; secondly, they could build, equip and man their ships for less than we could ; lastly, they effected an important economy by using small ships and making the vessel itself play the part of the attacking, or ' fast ' and the ' bending-on ' boats. In 1887 we spoke the *Flora* of Bergen, a sloop of 45 tons, whose captain gave me the following information :

' The majority of the Norwegian Bottlenose whalers are similar to the *Flora*, each carrying two guns in the bow, two in the stern, as well as two boats with a gun each . . . this year thirty craft will prosecute the trade.'

1 June 1941

The Norwegians first appeared in the Greenland Sea about forty years ago. A few years ago they were still confining themselves to the capture of Saddleback and Hooded Seals, their knowledge of deep-sea whaling being nil. In 1883 two of them served on my Uncle A's ship, doubtless with a view to acquiring a knowledge of the trade. Now they are catching so many that the price of the oil has fallen, and we are no longer able to make their capture pay.

This assertion is, I think, confirmed by what Dr. Nansen says in his *Hunting and Adventure in the Arctic*, and also by what Mr. Aagaard says in his *Fangst og Forskning I Sydis havet*. At any rate, in a letter dated a few years ago, he says : ' I mention in my book that your father taught the Norwegians how to kill the Bottlenose whales.'

The Norwegians first appeared in the Greenland Sea in 1849, and for a number of years they confined themselves to the capture of seals. About the year 1872 they sent a ship to the Davis Straits whaling, but the expedition was a failure and was not repeated. In 1882 their knowledge of deep sea whaling seems to have been nil. This much may be gathered from what Dr. Nansen says in his book *Hunting and Adventure in the Arctic* and what Mr. Aagaard says in his *Fangst og Forskning I Sydis havet*. At any rate, in a letter dated some years ago, he says : ' I mention in my book that your father taught the Norwegians how to kill the Bottlenose whale.' In 1883 two Norwegians served on the *Erik*, my Uncle Alexander's ship. Perhaps Mr. Aagaard is referring to this fact ?

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The Entomologist's Monthly Magazine for March contains ' The history of *Cicadetta montana* Scop. in Britain, 1812-1940,' by C. Morley ; ' A note on the female of *Homocidus arcanus* Stelfox (Hym. Ixhneumonidæ) ' by J. F. Perkins ; ' Note on *Philonthus mequignoni* Jarrige (Col. Itaphylinidæ) ' by C. E. Tottenham ; ' Note on British fungus gnats (Dipt. Mycetophilidæ) ' by F. W. Edwards ; and several shorter notes including ' *Criomorphus moestus* Boh. (Homopt. Delphacidæ) in Yorkshire,' by J. M. Brown (Robin Hood's Bay).

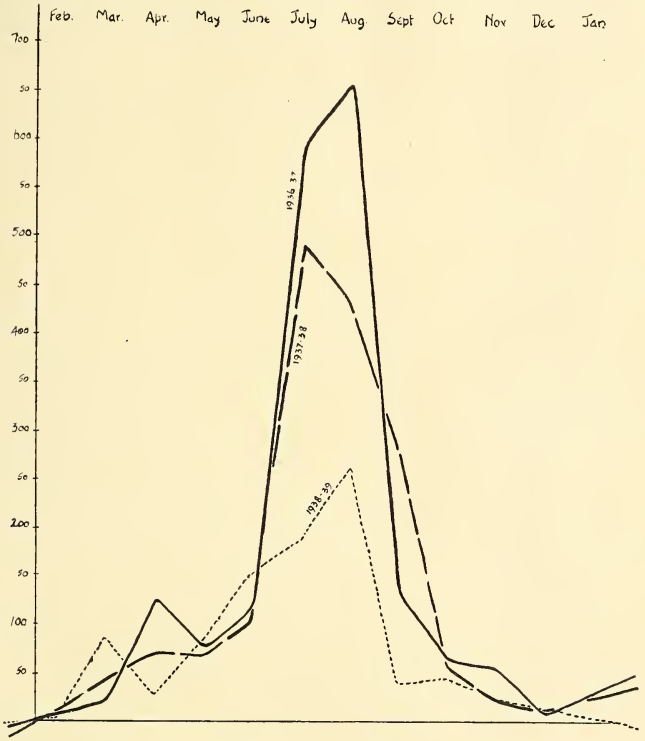
The Naturalist

BRITISH CARRION BEETLES

(*Continued from page* 124)

The Control Trap and its Significance

Claude Morley in his paper on coleoptera taken with carrion, which is quoted in the Bibliography, divides these coleoptera into four groups, *viz.*, shelter associates, or attracted so as to prey upon carrion feeders ; devourers of *any* decaying



Graph of the Monthly Occurrence of Coleoptera in the Traps.

matter ; occasional visitants (and more frequently located elsewhere) ; and genuine necrophaga.

The significance of my own findings is to a large extent governed by the data of the control traps which were set up next to the carrion traps at the beginning of the third year's work. The value of these controls becomes very evident if one makes comparison between the insects taken therein and the main analyses. Two beetles may be singled out at once as of special interest. They are *N. brevicollis* and *P. madidus*. Without the control a glance at the main analyses would suggest that the former is present in sufficient numbers to warrant its receiving a place among a list of beetles definitely

associated with carrion. The control, however, indicates very clearly that this species is purely what I term an accidental visitor. It is a generally distributed species with a fondness for gardens, and its presence in the control traps in such numbers when a much more alluring bait trap lay only the shortest of distances away shews its predilection very clearly. The ratio of control numbers and carrion numbers for the other beetle, however, strike a quite different note. Only in

Coleoptera taken from the Control Traps in 1938-39	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total
CARABIDÆ.													
Carabus violaceus Linn. v. *sollicitans* Hampe							1						1
C. monilis Fabr.						1							1
Notiophilus biguttatus Fabr.									1				1
Nebria brevicollis Fabr.		2	7	8	6	1			3	1			28
Pterostichus madidus Fabr.		4	5	5	31	39	9		10	3			106
P. niger Schall.						4							4
P. vulgaris Linn.				1	1	4							6
Calathus melanocephalus Linn.						1							1
Bembidion lampros Herbst.				1									1
Patrobus excavatus Payk.					1								1
Total		6	12	15	39	50	10		14	4			150
STAPHYLINIDÆ.													
Tachinus rufipes Degeer							1	1	1				3
Quedius mesomelinus Marsh.									1				1
Staphylinus globulifer Fourcr.		1											1
Omalium rivulare Payk.		1											1
Staphylinidæ sp.*					1								1
Total		2			1		1	1	2				7
SILPHIDÆ.													
Catops fuliginosus Erichs.					1					2			3
Sciodrepa watsoni Spence				1	1								2
Ptomaphagus subvillosus Goeze v. *sericatus* Chaud.					2								2
Total				1	4					2			7
LATHRIDIIDÆ.													
Corinomus nodifer Westw. Total					1								1
Grand Total		8	12	16	45	50	11	1	16	6			165

* Escaped.

February and March is the ratio appreciably smaller—nil to 1 and 4 to 11 ; thereafter it never falls below the proportion of at least one to three, even during the peak summer periods, when one might possibly expect a high number of accidental visitations ; indeed, in August the figures stand at 9 : 219, and in September the ratio is even greater. This removes, to my mind, any doubts as to whether *P. madidus* has a carrion instinct or not.

The remainder of the beetles taken from the control traps, if one excludes the few Silphidæ which were found there, appear to have very little bearing upon the final conclusions arrived at. *Omalium rivulare*, however, deserves mention. Morley says that as this insect is found in such a variety of situations, it cannot be claimed as a true carrion feeder.

The fact remains that no less than 66 examples in all were taken from the carrion traps, and of these 39 during the year when the control was established. In that time one specimen only was found in the control trap. If then it is, as it would seem to be, a matter of choice, *O. rivulare* must be grouped with those beetles with necrophagous instincts. It is rather strange that a small number of the very active little Silphids, all known to be found with carrion, should have occurred in the control traps. I think this signifies very little and does not affect the concluding deductions.

An analytical table of the beetles which were captured from the control traps is given on page 134. It is prepared on exactly the same line as that adopted for the main tables, and the various total figures will be found in their appropriate columns.

Habitats and Distribution

One must distinguish immediately between true necrophagous coleoptera, saprophytous coleoptera, phytophaga, and the like. From the literature that has been consulted on these subjects the habitat and distribution of the species under review have been compiled. Some of the coleoptera taken, it will be remarked, shew a great diversity of habitat. The tabulation of the monthly occurrence and distribution has been very much less easy, for the literature on these points is distinctly less informative.

The following explanatory signs have been used : a dash signifies that the species is found in such localities ; an H refers to observations recorded in the *Victoria County History of Yorkshire* ; and a Y applies to remarks published in the *Transactions of the Yorkshire Naturalists' Union.*

From personal experience I am inclined to place the following species in these categories. This grouping ignores data obtained from the traps during the years of investigation.

Generally distributed: *Nebria brevicollis* (iii-x), *Harpalus æneus* (iv-ix), *Pterostichus madidus* (iii-ix), *P. strenuus* (i-v), *Tachinus subterraneus* (x-v), *Proteinus ovalis* (spring and early summer).

Fairly common : *Carabus violaceus* v. *sollicitans* (v-ix), *C. monilis* (v-vii), *Pterostichus vulgaris* (iv-viii), *Trechus 4-striatus* (iii-x), *Patrobus excavatus* (iii-ix), *Tachinus rufipes* (iii-ix), *Philonthus chalceus* (cold weather), *Oxytelus sculpturatus* (iii-vii), *Ptomaphagus subvillosus* (early summer), *Coninomus nodifer* (iii-viii).

Local (but not uncommon) : *Aleochara lanuginosa* (iii-iv), *Necrophorus humator* (iv-ix), *Omosita discoidea* (spring and summer), *Cryptophagus* species (spring and summer).

The remainder of the species taken are all more or less

	Habitat																
	Carrion.	Decaying Bones.	Excrement.	Manure.	Vegetable Refuse.	Hay and Straw.	Moss.	Fungi.	Birds' and Mammals' Nests.	Social Insects' Nests.	Open Ground.	By Sweeping.	Under Stones, etc.	Under Bark.	Cut Grass, Leaves, etc.
Carabus violaceus Linn. v. *sollicitans* Hampe											—	—	—	—	
C. monilis Fabr.											—	—	—		
Nebria brevicollis Fabr.													—		
Ophonus pubescens Muell.													—		
Harpalus æneus Fabr.												—	—		
Pterostichus madidus Fabr.	—				—								—		
P. niger Schall.								—			—		—		
P. vulgaris Linn.	—										—		—		
P. strenuus Panz.													—		
Calathus fuscipes Goeze						—							—		
Læmostenus terricola Herbst							—						—		
Agonum dorsalis Pont.															
A. mulleri Herbst															
Trechus 4-striatus Schrank					—										
Patrobus excavatus Payk.							—						—		
Megasternum boletophagum Marsh.			—			—		—				—			
Aleochara curtula Goeze	—														
A. lanuginosa Grav.	—		—		—	—									
A. diversa Sahlbg.	—		—		—		—			—					—
A. sparsa Heer	—		—		—					—					
A. bipustulata Linn.			—					—							
Atheta angusticollis Thoms.															
A. crassicornis Fabr.								—		—					
A. inoptata Sharp		—		—				—	—						
A. trinotata Kraatz	—	—	—	—				—	—			—			—
A. aquatica Thoms.	—			—	—	—	—	—						—	—
A. zosteræ Thoms.							—	—			—		—		
A. fungi Grav.	—		—		—	—	—	—	—			—		—	—
Tachyporus pusillus Grav.					—		—	—				—			—
T. nitidulus Fabr.					—		—	—				—			—
Tachinus rufipes Degeer	—		—		—		—	—		—		—	—	—	—
T. subterraneus Linn.	—		—		—	—	—	—					—		—
Mycetoporus rufescens Sharp							—								
Quedius mesomelinus Marsh.	—	—				—	—	—		—			—	—	
Q. cinctus Payk.			—			—		—							
Creophilus maxillosus Linn.	—		—				—					—			—
Staphylinus globulifer Fourcr.													—		
Philonthus chalceus Steph.	—		—		—		—								
P. carbonarius Gyll.			—			—	—	—							
P. marginatus Stroem	—	—	—			—	—	—				—			
P. cephalotes Grav.	—	—	—	—		—	—	—		—					
Oxytelus sculpturatus Grav.	—		—			—	—	—				—			
Omalium rivulare Payk.	—		—			—	—	—	—			—		—	—
Proteinus ovalis Steph.	—	—	—			—	—	—	—						—
P. brachypterus Fabr.	—	—				—	—	—	—			—			—
Necrophorus humator Fabr.	—	—						—							
N. investigator Zett.	—	—						—		—					
Thanatophilus rugosus Linn.	—	—			—										
Catops fuliginosus Erichs.	—	—				—		—							—
Sciodrepa watsoni Spence	—							—	—						
Ptomaphagus subvillosus Goeze											—	—	—		
P. subvillosus Goeze v. *sericatus* Chaud.	—														
Hister striola Sahlbg.	—	—	—												
Gnathoncus punctulatus Thoms.	—	—			—	—	—		—						—
Saprinus semistriata Scriba	—		—						—						
Omosita discoidea Fabr.	—	—						—	—						—
Rhizophagus perforatus Erichs.	—							—				—		—	—
Coninomus nodifer Westw.	—				—		—					—			—
Cryptophagus umbratus Erichs.					—	—			—	—					—
C. badius Sturm			—		—	—			—	—				—	—
C. affinis Sturm	—				—	—		—				—	—		—
Atomaria linearis Steph.						—	—					—	—		
Simplocaria semistriata Fabr.							—					—	—		
Otiorrhynchus singularis Linn.													—		
O. sulcatus Fabr.													—		

Plant Pests.	Flood Refuse.	Coastal Areas.	Damp Localities.	Cellars.	Domestic Premises.	Monthly Occurrence: 1-4	1-12	3-5	3-9	3-10	4-6	4-9	6	6-7	6-10	7-9	10-4	Distribution: Generally Distributed.	Fairly Common.	Uncommon.	Local.	Rare.
			—									—		(!)					Y		—	
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	—					—					—												

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	Habitat																					Monthly Occurrence										Distribution				
	Carrion.	Decaying Bones.	Excrement.	Manure.	Vegetable Refuse.	Hay and Straw.	Moss.	Fungi.	Birds' and Mammals' Nests.	Social Insects' Nests.	Open Ground.	By Sweeping.	Under Stones, etc.	Under Bark.	Cut Grass, Leaves, etc.	At Sugar.	Plant Pests.	Flood Refuse.	Coastal Areas.	Damp Localities.	Cellars.	Domestic Premises.	1-4	1-12	3-5	3-9	3-10	4-6	4-9	6	6-7	6-10	7-9	10-4	Generally Distributed.	Fairly Common.	Uncommon.	Local.	Rare.
Carabus violaceus Linn. *v. sollicitans* Hampe																																					
C. monilis Fabr.																																					
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P. niger Schall.																																					
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Quedius mesomelinus Marsh.																																					
Q. cinctus Payk.																																					
Creophilus maxillosus Linn.																			Y																		
Staphylinus globulifer Fourcr.																			Y																		
Philonthus chalceus Steph.																																					
P. carbonarius Gyll.																																					
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Omalium rivulare Payk.																																					
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Atomaria linearis Steph.																																					
Simplocaria semistriata Fabr.																																					
Otiorhynchus singularis Linn.																																					
O. sulcatus Fabr.																																					

rarities which have only occurred to me occasionally or else not at all.

As regards the species exemplified by special letters in the Distribution Lists, the under-mentioned notes are of some interest :

C. monilis (Y)—generally distributed in the West Riding and not uncommon in the Harrogate district. *T. subterraneus* (Y)—a by no means common species, previous records being from Saltburn, Ayton, and York. *Q. cinctus* (Y)—very frequently met with along the coasts. *C. maxillosus* (Y)—more common on the coast than inland. *P. ovalis* (H)—a very local species, with records published from Saltburn and Askern. *S. watsoni* (H)—local in Hull.

A. inoptata is regarded as a rare Yorkshire species.

The following were new Yorkshire vice-county (64) records : *A. zosteræ*, *A. diversa* (first recorded from the county at all in 1935), *C. fuliginosus* (previously regarded as most uncommon), *C. umbratus*, *C. affinis*, *A. linearis* (an uncommon Yorkshire species).

G. punctulatus was new to the county list and is a rare beetle.

The analyses list of habitats, etc., on pages 136-137 requires no further discussion at the moment except, perhaps, to draw attention to the monthly occurrence of *Nebria*, which has been marked purposely with an exclamation. This beetle does, undoubtedly, occur freely all the year round, but the quoted months, June and July, appear to be rather positive, and they are certainly not borne out by my own experience—indeed, *Nebria* was a distinct cold season visitor, and only nine out of the 56 specimens taken were present in the carrion traps during the spring and summer. As opposed to these figures, 24 of the 28 examples found in the control traps *were* present in the spring and summer. These diametrically opposed facts are evidence of the great care which must be taken before expressing a scientific opinion.

(*To be continued*)

The Entomologist's Record for May contains ' Four Years captures of Insects in Light Traps in Ireland,' by B. P. Beirne ; ' The Ptinidæ of Economic Importance,' by H. E. Hinton; Collecting Notes ; Current Notes and Supplement; ' The British Noctuæ and Their Varieties,' by H. J. Turner.

The Entomologist's Monthly Magazine for May contains ' Hymenoptera, Hemiptera, Neuroptera, Trichoptera, etc., in East Lincolnshire,' by M. W. Graham ; (Insects taken at Old Bolingbroke near Spilsby, a fine list of aculeates and numerous symphyta, etc.) ; ' *Ptinus hirtellus* Stm. (Col. Ptinidæ) a British Insect, with notes on a few other species,' by H. Donisthorpe ; ' Results of the Oxford University Cayman Islands Biological Expedition, 1938 ; Descriptions of nine new species of Cerambycidæ (Col.)' by W. S. Fisher ; ' Larvae of British Beetles, II, A Key to the British Lamellicornia Larvae,' by F. I. van Emden.

CHAR IN THE LAKE DISTRICT

SYDNEY MOORHOUSE

THERE are few fish to be found in British lakes as fascinating to both angler and naturalist as the Char (*Genus salvelinus*), and certainly there are none that have been the object of so many interesting references throughout the ages.

Char is undoubtedly a cold-water fish (being unable to live in any water having a temperature exceeding 59° F.) and its range extends into both arctic and alpine regions. There seems to be no possible doubt that the ancestor of our Char was a migratory fish with habits of similar nature to the Salmon and Sea Trout, *i.e.* spawning in fresh water but spending a considerable proportion of its time in the sea. To-day Char are to be found in British lakes where the water is very cold, and, more often than not, deep, and as all access to the sea has been cut off in recent geological ages, the fish is now purely a freshwater form.

Tate Regan, who must be regarded as the greatest authority on the fish, has divided our British Char into two separate species, one of which is found in the lakes of England, Scotland, and Wales, and the other in the waters of Eire. So far as the Lake District is concerned, Regan further divides its Char into two sub-species, Willoughby's, or the Windermere, Char (*Salvelinus willoughbii*), which often attains a weight of 3 lb., and Lonsdale's, or Haweswater, Char (*Salvelinus lonsdalii*), a much smaller species which has a length of some 7 in. and a weight of about 3 oz.

To-day, Char are to be found in the lakes of Windermere, Coniston, Crummock, Ennerdale, Haweswater, Buttermere, and Wastwater, and also in the tarns of Goat's Water (1,646 ft. above sea-level) and Seathwaite (1,230), both in the Coniston Old Man massif. At one time they were exceptionally common in Ullswater, but now the fish is rarely, if ever, caught there, and they are also absent from Grasmere, Rydal Water, and Derwentwater. Char are also to be found in the River Brathey, which flows into the head of Windermere, during the breeding season, which extends from November to February.

Legend ascribes the introduction of Char to the Lake District variously to the Romans and the monks of Furness and other religious establishments, but as Willoughby's Char are also to be found in such Scottish lochs as Builg (Banffshire), Marie (Rosshire), Baden and Borollan (Sutherlandshire), where there were neither Roman nor monkish settlers to introduce them, it would seem that such a belief is based upon pure romantic fancy (and, dare one add, wishful thinking) rather than founded on concrete evidence.

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One of the earliest references to Lakeland Char was made by Camden in the early part of the eighteenth century when he stated Windermere to abound ' with chare, a golden Alpine trout.' These, he went on to say, were of ' two sorts, called by some, from their colour, the *silver* and the *golden* char, and, by others, from a supposed anomaly that each breeding fish only spawns once in two years, the *case* char and the *gilt* char, the latter being thought the same as the silver char, and only retaining its name for the year that it is barren ; it is accounted the most delicious, and is baked and sent in pots to London. A Windermere char is near twice the size of the herring. Its back is of an olive green, its belly of a light vermillion, softening in parts into white, and changing into a deep red at the injection of the fins.'

Clarke, who is generally acclaimed as ' the father of lake-angling literature,' penned a graphic description of the hauling of the Char and Gwyniad (*Coregonus pennantii*) nets on Ullswater in the year 1787. These, he explained, were laid in order to form an acute angle with the shore, and then the fishermen had to row round, making a great splashing of oars, in order to scare the fish into the trap. Since Clarke's time, however, Char have disappeared from Ullswater, rubbish draining into the lake from the Green side lead mines having introduced poison and is the chief cause of the disappearance.

In the early part of the nineteenth century Dr. Davy made strenuous attempts to introduce Char into Grasmere and Rydal (the latter seemingly presenting ideal conditions for the fish), but without any success attending his efforts. Attempts to introduce the fish into Derwentwater on several occasions have also failed.

Dr. Davy also reported that in his day the Ennerdale Char spawned in a rocky pool known as the Char Dub up the Liza beck and stated that they were present in such numbers ' as to darken the waters,' but to-day the Char (which are not present in Ennerdale in anything like the same numbers as they were in Davy's time) spawn on a shingle further up the same stream.

Anglers have found that the Char's mode of living varies in accordance with his abode. In Haweswater it frequently takes the fly ; in Ennerdale a winged ant (in its season) affords the best bait—a curious trait observed nearly two hundred years ago—and in the two tarns previously mentioned wasp grup has proved a most useful bait. Char fishing, however is more the preserve of the professional than the amateur angler, for the plumb-line needs a deal of practice in handling to become proficient.

THE BADGER

T. HYDE-PARKER

COMING across recently the characteristic and unmistakable track of a Badger, it struck me that none perhaps among our comparatively short list of native mammals is so widely, if irregularly and sparsely, distributed, yet so little known. Indeed, though its ill-treatment in days gone by added a verb to one language, it is but a name to the vast majority of Englishmen.

The Badger has been an inhabitant of this country ever since the Pleistocene Age, thus being contemporary with beasts that have long disappeared. It was formerly considered as belonging to the Ursidæ, but scientific opinion has changed and since the bear became extinct in these islands—as recently as the eleventh century—we have no longer a true representative of that family.

The wonder is that the Badger survived at all, for it would seem to have suffered persecution since the memory of man knoweth not to the contrary. In old days it was better known as Brock—a word admitting of either Celtic or Scandinavian origin—and its wide distribution may be gauged by the number of place-names founded on this, such, for instance, as Brockholes and Brocklesby, to take a couple of northern instances. Another name was Bawsen, which apparently signified *pied*—or in this case, *striped*—and I find in some old churchwardens' accounts, sundry disbursements for ' Boson heads.' It was also called a Gray, and there is an Act of Elizabeth providing payment for the heads of Foxes and Grays.

' That ancient, peaceable and respectable quadruped,' as Charles St. John terms it, inhabits all three kingdoms, and, while seldom present in great numbers, and sometimes non-existent in what might reasonably be supposed likely localities, is to be found in many districts where its presence is hardly suspected. The New Forest is, or was, reputed to be one of its favourite haunts, presumably especially so round about Brockenhurst ; yet Gilbert White, no great distance away, did not even mention it. Long ago in Leicestershire where, then at any rate, Badgers were far from rare. I remember as a youngster being thrilled by the chance of watching for one to come out of its sett. Even then I didn't see it actually emerge, despite the fact that I seemed to keep my eyes glued on the exit hole : one moment there was nothing, the next, there it was, outside ! Often since have I had occasion to observe this with various wild creatures.

Here, in the East Riding, the Badger, though seldom seen, is not uncommon, and was presumably even more plentiful

on the Wolds in days before enclosure and when that wide area was largely a series of warrens, as denoted by such place-names as Cottam Warren, etc. In our own parish on the coast, a communal establishment in one of the ghylls is always occupied by either foxes or badgers—frequently by both—while there are occasional setts along the cliffs. The amount of earth thrown out is enormous, and gives some idea of the elaborate habitation within : an abode, too, which is kept scrupulously clean and tidy.

The appearance of the Badger is familiar to many who never saw that animal in the flesh, the longish snout, with a tapering black streak running the entire length of the head on either side, giving it an almost unique expression. It is a low, powerful beast, with short legs, stumpy and rather bushy tail, and a rather loose though tough skin. It has long, curved and very useful claws, which it is much given to exercising on the trunks of trees, much as cats do on the legs of chairs—and sometimes on those of human beings ! The footprint shows the marks of all five claws, well detached, as it were, from the pads of the toes. Incidentally, the animal possesses scent glands, and, though normally perfectly sweet, can, on occasion, give forth the most appalling stench. Taking it all in all, a beast to be reckoned with, though a sharp blow above the nose seems to incapacitate it completely. Once, hearing that a stray one was doomed in any case, I offered to shoot it, partly that I might have the excuse to watch it beforehand, but also to ensure it a merciful end. Then a charge of B.B. shot from the left barrel killed it instantaneously. This was the only specimen I have myself weighed, turning the scale at 28 lbs., though it seemed much more by the time I had carried it a mile or so on a muggy autumn evening. The average weight in Cornwall, where they used to be plentiful—nearly every inn possessed a stuffed one—would appear to be 30 lbs., while one mentioned in *The Naturalist* some time back was 32 lbs. ; and even this is by no means a record.

The Badger is a cleanly beast, despite popular belief to the contrary. Furthermore, I may say *en passant* that the old rural simile ' sweating like a brock ' has no reference to our present subject, the same name being applied to the quaint little ' cuckoo-spit insect ' which was supposed to produce its frothy shelter in this manner.

It used to be believed, needless to say, quite erroneously, that, to facilitate progress on hillsides, a Badger's legs were shorter on one side than the other, though whether the near or the off is not stated. Sir Thomas Browne, wise beyond his generation, already doubted this ; but in much more recent years even Macaulay appears to have shared the notion, for

he says, ' I think that Titus Oates was as uneven as a badger.' I never heard it suggested what would happen were one to wish to retreat, though, in such case, the animal's known ability to move backwards would come in useful !

None of our mammals is, I should say, more exclusively nocturnal, and evidently

Dark night that from the eye its function takes

simply don't affect Badgers. The only ones I have seen in a natural state did not turn out till dusk, and this generally applies even when the nights are shortest. On emerging from the sett, they appeared to listen intently and sniff the air all around before setting forth. They are generally rather silent animals, and Grymbert Dacks, in the old legend of Reynard the Fox, had a lot more to say than any of his tribe I have encountered. The sound they do make was likened by that night prowler the ' Scotch Naturalist ' to ' a kind of snarling grunt.'

The Badger, of course, hibernates, but not always uninterruptedly, for he will emerge at odd times under favourable weather conditions, and I once detected footprints after a light fall of snow.

The young are born blind, and are some time before they feel equal to facing the outer world. They are then quaint little chaps and quite playful, though hardly, I think, so frisky as fox cubs at the same stage. They may easily be tamed, and I well remember one which a friend had years ago. It was romping about my feet when I gave it a little push, whereupon it turned and bit at the offending toe, leaving a tiny milk-tooth embedded in my shoe !

As regards food, our friend may truly be termed omniverous, and, if he sometimes plays havoc with young rabbits, I, as a gardener in a rural district, certainly do not bear him a grudge ; nor, I should imagine, does the Government at the present time. Among other items in his menu may be named rats and mice, frogs, snails and slugs (especially, I believe, *Arion ater*), worms and beetles. Also fleshy roots such as those of the bluebell and cuckoo-pint, and our old schoolboy favourite the pignut, with even mushrooms on occasion. Wasp nests he raids for the larvæ, as he does the ' bykes ' of wild bees for honey, his thick, bristly coat rendering him immune from retaliation. It is said he also visits rookeries in springtime, to snap up unconsidered trifles in the way of fallen young birds ; and, if he sometimes feasts on eggs, as the late A. H. Patterson said, ' his war on vermin amply outweighs a little egg-poaching.'

The uses to which the mortal remains of the Badger have been applied are mostly things of the past. To go back to

Biblical times, and assuming that this was really the animal implied, the skin was cured and used for such diverse purposes as covering tents and cobbling shoes. The flesh was eaten at one time ; on the Continent, certainly, and I seem to have heard of badger hams in Ireland. As for the grease—well ! Hear what a Cotswold worthy is reputed to have said in a district, too, noted for badgers, ' There's nothing like badger's fat for curing the rheumatism—aye an' most anything else you can think on. It's so strong that if you was to put a lump on your chest, your hair'd stand on end.' The bristles, again, used to be used for making shaving-brushes. Actually the French have but one word (*blairean*) for both animal and product ; but few, proportionately, some present-day shaving-brushes can, one would imagine, be attributed to that source.

And now we come to a painful subject : the persecution which has ever been meted out to this peaceable and mostly inoffensive animal. It was always considered fair game to harry the unfortunate Badger in its native haunts, mainly because it put up a good fight. A fearsome weapon not unlike a gigantic corkscrew was sometimes employed to extract it from its lair, and one also reads of ' badger-tongs ' ; but, of course, dogs were mainly used. I may say in this connection that despite the name such Dachshunds as I have had personal acquaintance with seemed scarcely fitted for so tough a job. Humanitarian ideas as to the treatment of animals are of comparatively modern growth, and those who remember their *Guy Mannering* will recall honest Dandie Dinmont's amazed ' but Lord save us. To care about a brock ! '

Even worse than this was the ' barbarous and dastardly sport ' of baiting captive badgers, which used to be extensively carried on alike in country and town. This, for instance, would seem to have been one of the attractions of old Magdalen Fair, in Holderness, where it was known, for some obscure reason, as the ' game of O.E.,' the unfortunate victims (though they sometimes came off best) being obtained from Burton Constable Woods. Happily, all this has long been prohibited, and, if it takes place surreptitiously, amounts to little nowadays.

There remain, however, the efforts of Masters of Hounds, keepers and some farmers ; and, as this is a subject on which I hold strong opinions, it will be well perhaps merely to quote the views of one or two recognised authorities. So far, then, as concerns the hunting point of view, *The Field* (April 29th, 1933), states, ' There is no evidence that the presence of badgers is in any way deleterious to the interests of fox hunting. The two animals can, and do, exist in the same woodland, and there are numerous occasions on record where they have been found inhabiting the same earth.' Mr.

H. Mortimer Batten, the noted naturalist, and incidentally a great authority on this particular point, says *in litt*, ' When Hoddingtonshire was a hunting county, all the foxes were dying off from red mange, and they effectively introduced badgers to clean up the earths. In view of the filthy habits of the fox and the notorious cleanliness of the badger, I am surprised that anyone could accuse the latter of fouling the earth.'

Many writers have dealt with the standpoint of game-preservers and agriculturists. Among others, that excellent naturalist who wrote under the pseudonym ' Son of the Marshes ' remarks, ' The fox has grace of sanctuary allowed him by some for their own purposes. If only the same protection had been awarded to the badger, it would be well for our farmers, large and small.' R. Lydekker said, ' The persecution to which, in this country, it has always been subject at the hand of man, is due rather to the innate desire of killing and hunting than on account of any damage inflicted ' ; and finally J. E. Harting gives it as his view ' the harm done by badgers to game preservers is almost infinitesimal.'

With that we leave this painful aspect of our subject—and the subject itself. That the Badger has survived at all is probably largely due to his shyness and caution, which qualities he still possesses in large measure. Long may he remain a quiet, interesting and inoffensive feature of our countryside.

The Natural History of Goathland Dale I.—The Geology and Topography by **D. J. Bevan,** pp. 7, 1/-. **II.—The Birds: An Ecological Study, 1923-1938** by **W. S. Medlicott,** pp. 32, 2/-. The first two papers of 'The Natural History of Goathland Dale' have now been published in *The North Western Naturalist*, the first by D. J. Bevan, on 'The Geology and Topography,' and the second by W. S. Medlicott, on 'The Birds: An Ecological Study.' The first paper forms a short but interesting commentary on the formation and structure of the Goathland district, and it contains notes on discoveries which have been made relating to early man.

The second paper consists of a list of the birds that have come to the notice of the author-resident during the years 1923-1938, with some short notes ; and is somewhat marred for reference purposes by an attempt to classify species ecologically with results that hardly justify the attempt. Birds will not keep to environments chosen for them. We might have inferred that the Yellow-Hammer almost entirely nests on the ground in this district had we not had ocular evidence otherwise. The list compiled from Capt. Medlicott's notes is good, and there are many interesting comments. Questions may arise in the minds of readers. Does the Wood Pigeon on moorland feed only upon bilberries? Are the movements of Chaffinches *all* local? Why are Garden Warbler, Song Thrush, Whitethroat, Blackbird, so ordered under the same heading of ' Bushes and Hedges ' ? Does not the Greenfinch nest in conifers in gardens other than that of Water Ark Lodge?—R.C.

THE CAVES OF THE SADDLEWORTH AREA

SYDNEY MOORHOUSE, F.R.G.S.
(Member of the Northern Ecological Association)

THE Saddleworth hills, on the borders of Yorkshire and Lancashire and not far away from the towns of Oldham and Huddersfield, have been described as the most sombrely beautiful in the Pennine Chain. In the British Geological Survey of *The Pennines and Adjacent Areas* (H.M.S.O., 1936), Dr. D. A. Wray classifies them as being in the Zone of *Reticuloceras* section of the Millstone Grit Series. Under the thick strates of Millstone Grit, however, is a bed of Yoredale Shale. On top of the Millstone Grit is a thick layer of peat consisting largely of cotton-grass and vegetation is limited to cotton-grass, bog-moss, heather and other moorland plants.

It is not generally realised that these hills contain quite a number of small caves and while there can be no question of comparing these with the pot-holes and caverns of Craven and Derbyshire they are interesting as affording excellent examples of Gritstone fissures.

The Millstone Grit ' headland ' of Alderman Head, which overlooks the main Manchester-Barnsley road about a couple of miles to the east of Greenfield, contains one of the most interesting of the Saddleworth caves. This is blessed with the rather poetic name of Fairy Holes but anyone intending to make its descent must remember that he will be more likely to find mud and dirt than anything in the least resembling the fairy-like grandeur of the North Yorkshire caves. The name, however, is interesting and one of the members of the Oldham Cave and Crag Club (an organisation which has accomplished a great deal of useful work in these caves) once told me that it is believed that the old natives of Saddleworth imagined that fairies were in residence at the bottom of the crevice. It may be that there is some folklore concerning this cave that is well worth the attention of an enthusiast.

The entrance to the Fairy Holes is along a low passage, usually well lined with mud. After crawling for a few yards one has to engage in a mild acrobatic performance in order to make sure that the legs and feet are in front of the body for what is the most difficult portion of the descent.

Suddenly the cave turns sharply away to the right and there is a sheer drop of thirty feet below. Luckily the gap is easily bridged by the body and the explorer finds himself seated at the top of a slippery sloping slab which must be descended to the second level of the cave. A rope is usually

employed to descend into the next chamber where there is a long passage about 100 ft. in length and sometimes difficult to get through because of its narrowness.

The most interesting feature of this cave is that the two sides are composed of Gritstone slabs which if placed together would dove-tail into each other perfectly.

There are other holes in the same vicinity which I have descended by the aid of a rope, but these are chiefly deep fissures in the hillside, and the one described in detail is by far the most interesting.

On the opposite side of the Greenfield Beck to Alderman Head is the V-shaped gorge of Chew Valley, one of the wildest of the Pennine cloughs. Here again Millstone Grit forms the precipitous sides and outcrops, but the Chew Beck itself pours over a bed of Yoredale Shales. It would seem that at one time the valley was a cave roofed with Millstone Grit and that the collapse of this roof formed the valley of to-day. There is an example of a stream tunnelling the Millstone Grit and leaving a natural roof, or bridge, in Marsden Clough, above Holmbridge, near Huddersfield.

Not far from the head of Chew Valley is Warm Hole, the deepest of the Saddleworth caves. I am told that when snow covers the hills, that round the entrance to the cave always melts and a misty vapour comes out of it. This fact suggests warmth and may have something to do with the name. Other people have suggested that the name is a corruption of 'Worm Holes,' from the fact that the Saxons called snakes 'worms,' and that a snake used the hole as a lair, but it is difficult to separate authentic legend and folklore from mere flights of fancy.

The total depth of Warm Hole is somewhere in the neighbourhood of 85 ft., and in shape it is arranged like a twisted well shaft, in a series of steps ranging from 15 to 20 ft. high. One enters by way of a tiny cavern, which has a small rectangular hole in the floor. This curves under the cave and then drops away down to the first level.

Warm Hole was first explored in 1899 and no further descent was made until 1933 when a party of Oldham enthusiasts, who later formed the nucleus of the Oldham Crag and Cave Club, reached the bottom. They had been warned to look out for a bottle containing a message left behind by the original party and this was found and brought to the surface. The text of the message was as follows :

'Memorandum that the following gentlemen, whose names are appended to the foot hereof, made a thorough

examination of this cavern at midnight, September 23rd, 1899.'

(*Signed*) Edward Mallalieu.
W. Waring.
—. C——ton.
W. H. Bromley.
G—— Byrom.
S. S. Williamson.
C. W. Bromley.
J. T. Bradbury.

Unfortunately, the folds in the paper made the third and fifth names undecipherable.

Both bottle and paper were replaced at the bottom of the cavern and were still there when I was last down Warm Hole three or four years ago.

It would seem that there are other Gritstone fissures in this district yet to be discovered and which would throw still more light on some geological curiosities deserving to be wider known.

Bird Research, Vol. I. (Parts 1 and 2) by **Noble Rollin** (7/6 per part, from the Bird Research Station, Primrose Cottage, Glanton, Northumberland). The dedication is 'To World Watchers,' and Part 1 consists mainly of tabulated data with notes on the information thence to be derived. Counts of Black-headed Gulls, in different stages of plumage, at various haunts in Tyneside and beyond, in autumn and winter, indicate interesting local age distributions, immature birds being mainly segregated from adults, and intermediate stages from each other, although all return to the same sleeping place for the night. Reasons are discussed and many interesting observations made. Further tabulated data refer to times of morning and evening songs and calls of a number of species, study of which also reveals interesting results. Part 2 is largely concerned with records made in Manitoba, expressive of 'a conception of field study based on the relative intensities of Bird life,' 'Polar swing' is discussed—a term used by Mr. Rollin for the tendency of birds breeding in extreme northern ranges to push back their wintering range to relative extremes in the south, species for which Northumbrian Abel Chapman coined the phrase 'globe-spanner,' —— ; and the suggestion is made that 'a high intensity of polar swing' corresponds with 'a high intensity of plumage change,' *i.e.*, between summer and winter plumage. The points urged are modestly stated and based on considerable data. A flash photograph of a Jackdaw asleep at night in an old Northumbrian shed illustrates 'low intensity,' as the migratory White-crowned Sparrow, photographed singing from a post at the upper limit of its breeding ground in Manitoba illustrates 'high intensity.' There is no indication of the frequency or times of issues of further parts. The two parts received certainly contain food for thought and quiet study, perchance for corroborative field observation. The format is unusual, but servicable to present the concentrated results of much original research and careful notation for assimilation by those who value such. No doubt the price could be lower with a 'high intensity' demand for such published work.—R.C.

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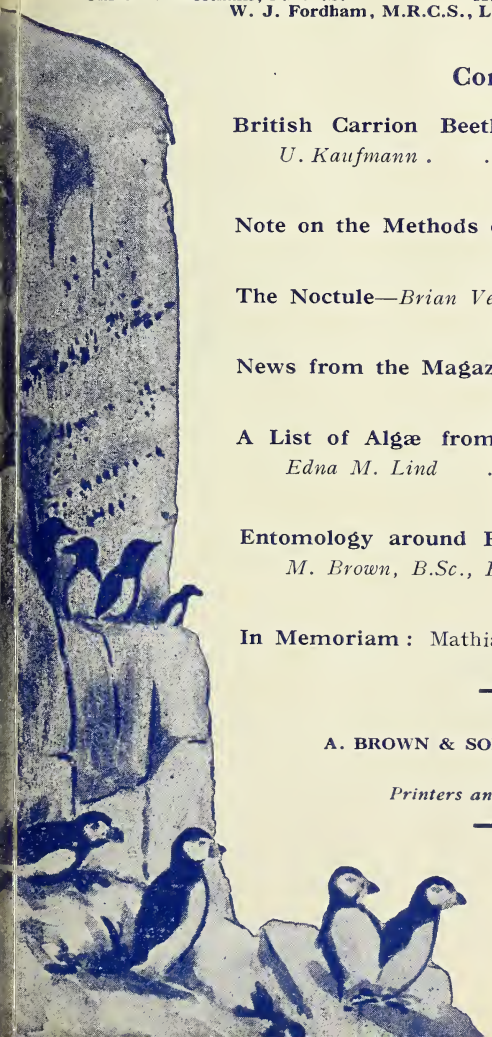

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BRITISH CARRION BEETLES

(*Continued from page* 138)

Deductions based upon the Analyses

Taking as a basis a minimum of eight examples occurring during the years of investigation, the under-mentioned species may be regarded as :

Distinct Necrophagous Coleoptera.—*N. brevicollis, P. madidus, P. niger, P. vulgaris, A. curtula, A. crassicornis, T. subterraneus, Q. mesomelinus, P. chalceus, P. cephalotes, O. sculpturatus, O. rivulare, P. ovalis, N. humator, N. investigator, C. fuliginosus, S. watsoni, P. subvillosus* v. *sericatus,* and *C. umbratus.*

Of these, however, *Nebria* has already been singled out and its presence explained, and so it must be removed from this list. *P. niger* does not seem normally to be associated with carrion, and in spite of its numbers (not omitting to compare them with the control figures) further evidence is required before an opinion can be formed. *A. crassicornis* may be placed in a similar category. *C. umbratus* was present in barely sufficient numbers to warrant its inclusion in the above list, and again, it is more generally taken by sweeping from open places and from under grass, etc. ; it has, too, a great liking for animals' and birds' nests ; therefore, it must also be deleted from this group. The remaining species are all associated with carrion—not necessarily exclusively.

The following would appear to be interested in carrion since they have occurred during at any rate two of the three years of research, and they may be grouped under the style of :

Occasional Visitors with Necrophagous Instincts.—*C. violaceus, P. strenuus, L. terricola, A. angusticollis, A. zosteræ, A. fungi, T. rufipes, C. nodifer,* and *A. linearis.* Of these, only *A. fungi, T. rufipes,* and *C. nodifer* are known to occur with carrion ; the remaining species are more generally found with plant matter, and in the case of the Carabidæ, they are, of course, essentially carnivorous hunters.

This leaves the remainder of the species recorded, irrespective at the moment of the fact that some are necrophagids, and these it is suggested should be termed Accidental Visitors. (No notice is taken of those Staphylinidæ recorded in the tables which escaped capture during their transfer to the killing bottle.) One will have, however, to distinguish the Distinct Necrophagous Coleoptera from this last group, for ample recorded proof of their carrion activities exists. They are *A. lanuginosa, A. diversa, A. sparsa, A. inoptata, A. trinotata, A. aquatica, C. maxillosus, P. marginatus, T. rugosus, H. striola, G. punctulatus, S. semistriata, O. discoidea,*

AUG 4 -

R. perforatus, and *C. affinis*. It will thus be seen that this last enumerated list of species may quite conveniently and correctly be grouped with the first one, for the insects mentioned there shew, too, a great diversity of habitat.

The presence of the two *Otiorrhynchi* is not taken into account here at all. They are garden pests, *O. singularis* being taken frequently off Delphiniums and Chrysanthemums, and *O. sulcatus* occurring with Primulæ, Saxifrage, and Beet among other plants. It may be added that neither was common in the district.

Conclusions

I.—Experimental Influences.

(*a*) *The Traps*. As has been said elsewhere, the eastern trap was always less susceptible to moisture than that buried on the western side of the garden. Dampness undoubtedly assists in the decomposition of the bait, but on the whole, its influence was not sufficiently marked to give rise to comment. During the three years the numbers from each trap so waxed and waned that no specially noticeable fact emerged.

(*b*) *The Bait*. The type of bait used very distinctly affects results. Lights were infinitely superior to the cooked meats, fish, etc., used on occasion. In the matter of the attractive power of bait, one cannot do better than to refer to Walsh's valuable contribution to this aspect of the subject. In his paper he says that ' those baits are most attractive which are most quickly decomposed . . . ' Chemical confirmation of the processes determining the rate of decomposition of animal compounds and the consequent loss in decoying value would produce data of great interest.

(*c*) *Predispositional Necrophagous Influences*.

Many of the species given in the preceding lists are inclined to a necrophagous life, if one accepts the literature concerning their habits and the experimental evidence of their association with carrion recorded here. They appear to be insects which, given the choice between animal and vegetable remains, in preference choose the former, and thus, while they may be collected from other localities, they may be expected with reasonable certainty to appear in traps specially prepared against their arrival. On the British list there is a very large number of coleoptera which are known to be found with carrion ; Fowler, for example, says that many of ' the Staphylinidæ . . . are in great measure necrophagous ' ; the reason that many well-known carrion beetles have not occurred in these traps lies in the fact that the locality is not congenial to them. This will be more readily appreciated if one examines, to quote just two cases, Walsh's list of captures from the Scarborough area and Morley's finds.

One thing is certain ; rough analyses of the published records shew the urgent need for the systematic establishment of traps in a variety of localities, and I have already expressed this opinion elsewhere to the effect : ' The more one considers them the greater the possibilities and ramifications of such a scheme become. It might well be extended to include saprophytic coleoptera, stercoraceous beetles and others, when, naturally, the nature of the bait would have to be varied. Such a vast scheme, spread out over the country so as to include every conceivable geological stratum and surface structure would reveal an amazing light upon the movements, numbers and species of coleoptera inhabiting these islands.'

This discussion would not be complete without some detailed reference to *Pterostichus madidus*—the numbers in which it was taken demand this. It is, probably, the most common garden species that exists, although its distribution is by no means entirely horticolous ; its range is ubiquitous and its numbers generally profuse. Carnivorously disposed, it normally prefers the taste of fresh animal matter to that of decomposing carrion, and, indeed, the general inclinations of the Carabidæ as a whole are too well known to bear repetition here. Why should the total fauna represented in the lists include a predominance of *P. madidus* to the extent of some 74 per cent. ? This enormous percentage would at first indicate that it is specifically predisposed to a necrophagous existence, but this is surely not the case, for the records of its warrior-like pursuits and hunting forays are numerous. Since *P. madidus* is discovered wherever a suitable diet is obtainable, and by reason of its well-developed ambulatory and sensory organs, unusual conditions such as the present ones are bound to hold its interest. In normal circumstances it would not have such outstanding opportunities for the disposal of carrion ; that, surely, is work reserved for the necrophaga proper, and the latter lose no time over it for many obvious reasons. But at Pannal Ash inhumation of the carrion was out of the question, for the bait was primarily enclosed with the object of attracting coleoptera but at the same time preventing any attempt on their part to dispose of it. The diptera, smaller Staphylinidæ, and even the larger Silphids did on occasion succeed in reducing the bait a little, but it was not interred, and the characteristic and powerfully alluring odour continued to exert its influence. This was not disregarded by *P. madidus*, which scented a favourable and easily-attained food supply, and the result was, by reason of its abundance in the garden—a hunting ground of excellent merit even at ordinary times—it fell an easy victim to the wiles of the trap and continued to do so throughout the season. In quite natural conditions the proportion of *P. madidus* to,

say, that common and well-distributed necrophagid, *N. humator*, would be more than sensibly reduced, for the latter would not permit the carrion to remain undisturbed in such a position likely to draw forth the attentions of so unwelcome an assistant as *P. madidus*.

II.—Seasonal Influences.

1. Carabidæ. The period of their greatest activity is during the months of May to October. The graph of *P. madidus* illustrates this very well. From November to April inclusive considerably fewer examples were taken. The peak periods are in July and August. September shows a distinct falling-off in numbers. At the height of winter very few ground beetles are at work.

(*a*) *P. madidus*, *P. niger*, and *P. vulgaris* are about during the warm months and even until the end of autumn.

(*b*) *N. brevicollis* is principally a cold weather species which is usually absent in the hot season.

(*c*) The remaining members of the family here represented occur largely during the warmer periods of the year.

(*d*) The family represent 23 per cent. of the total species taken, but among themselves only some 13 per cent. may be regarded as shewing an affinity for carrion.

2. Staphylinidæ. These are occupied practically the whole year round, but they are more abundant during the colder months.

(*a*) *A. curtula* and *A. crassicornis* seem to be exceptions to the rule and are at their commonest in hot weather.

(*b*) *T. subterraneus* is essentially a winter and spring species, being more abundant during the former. This emphatically bears out the literature on the insect.

(*c*) *P. cephalotes* is more common during the warm months, but it does occur in all seasons if the weather is not too unfavourable.

(*d*) *O. sculpturatus* is evidently a cold weather worker. This is at variance with the references consulted and with my records of the genus, for many examples occurred on the wing during the summer months.

(*e*) *O. rivulare* also prefers the cold and on only one occasion was it present during the month of June. In this connection it is not irrelevant to note that Walsh recorded ' an abundance of *O. rivulare* ' from Raincliffe Woods in June, 1931. However, one gathers that the weather around that time was wet (so the temperature was probably cool) for one of his traps was spoilt ' owing to the entrance of water.'

(*f*) *P. ovalis* occurs at strength during the spring. During the autumn and winter it is still present though in greatly diminished numbers. Here, again, Walsh's cold weather

records from Scarborough support this statement, and it would seem that its winter increase depends to some extent upon thermal conditions: mild and sunny weather in winter immediately arouses it; intense cold causes it to retire until the finer weather returns.

(*g*) The remaining members of the family taken exhibit a tendency to restrict activities to the months between October and July. The end of the summer and the beginning of autumn were not productive of many species, and in any case, their infrequent occurrence does not permit of a positive statement upon their more serious labours during the various seasons.

(*h*) Nearly 45 per cent. of the captures are Staphylinidæ, and 65 per cent. of these are necrophagous when the opportunity occurs. (These figures do not take into account specimens lost).

3. Silphidæ. There is a well-balanced activity shewn by members of this family. The large species appear to work during the warm months and make way for their smaller brethren in cold weather. This overlapping is indeed admirable and one which must effectively dispose of a superfluity of decomposing animal matter at any given time of the year. The Silphids taken may be grouped as under.

(*a*) *N. humator* is occupied from April onwards until the following October. Principally in July, *N. investigator* turns up to help it, but it always puts in a later appearance than the former, and further, it retires again earlier in the year.

(*b*) *Catops*, and *Sciodrepa* and *Ptomaphagus* to a lesser degree, is busy practically throughout the year and more especially so during those times when *Necrophorus* is away. *Sciodrepa* is dependent rather upon the weather and prefers the summer and early autumn—such periods when *Necrophorus* is beginning to get scarce. *Ptomaphagus*, it will be noted, adequately filled in a gap in 1938 when the two small Silphids were absent.

(*c*) There was little evidence to supplement Fabre's experiences regarding the longevity and cannibalistic tendency of the *Necrophori*, for with an occasional exception which has been noted, all the examples taken were in excellent fettle, being sound-limbed and very much alive even during the last months of their appearance.

(*d*) As stated, the necrophagous life of the Silphidæ seems to be well planned; the more cumbersome insects are active in the hot weather, their place is taken by the smaller very active species during the cold seasons, and there is even an overlap when all are working together. There are biological reasons for this arrangement and they may well be these. In the summer the greatest animal activity is manifest, and there

is a correspondingly higher death rate. Large and industrious necrophagids are therefore necessary so that the remains may be expeditiously removed from sight and smell. In the winter, however, migration and hibernation result in a more marked scarcity of carrion ; food supplies being limited, thus it is that the larger carrion insects must either forego their normal diet in favour of a more easily obtainable one, as is the case with *N. humator*, or else they in their turn must hibernate or succumb. The smaller necrophaga are satisfied with greater ease ; their diet is more catholic, and on the restricted food supplies at their disposal during the cold months they find what sustenance they require and eke out a reasonable existence until conditions improve.

(*e*) Less than 11 per cent. of all the species taken are Silphidæ. Nearly 86 per cent. of them are carrion feeders, however. That so few Silphids were recorded from the traps may be due to the nature of the district, and confirms earlier remarks upon the general paucity of this group of beetles in the field.

4. Histeridæ. This family was most disappointing. Six examples of three genera is a strikingly poor yield, and it would seem that the family is far more localised than is generally supposed. It is curious, too, that they only were taken during the first year of experiment. Walsh's traps, with the exception of two occasions when he recorded ' a great number of *Hister* species ' and ' many *Hister* species ' respectively, did not on the whole produce much evidence of the numerical strength of the family. Morley produced a short list taken from his carcases, and Selous has a note on their being with the body so as to prey upon the fly maggots which developed.

(*a*) A thorough checking of the distribution of the family is needed.

(*b*) They were summer visitors here.

(*c*) They represent 4 per cent. of the total captures, and are 100 per cent. necrophagous.

5. Cryptophagidæ. These are generally regarded as vegetable feeders, and some are associated with other animals. Their numbers are just large enough to be singled out for comment.

(*a*) They are mostly confined to the early and late seasons of the year, and in mid-winter their activities cease.

(*b*) *C. umbratus* was present at its highest rate in April.

(*c*) Six per cent. of captures were members of this family, and of this number only *C. affinis* is likely to be encountered with carrion.

6. The remaining families are nearly all represented by single genera ; only in the case of the Curculionidæ have the

species repeated an appearance. It is thus out of place to comment upon any of these insects other than what has already been said.

III.—Final Deductions

As Walsh has said, necrophagous coleoptera manifest an active existence throughout the year. This is largely undertaken by the smaller species during the cold season and by the bigger ones in the summer months. It may well be that because the latter are so much more well-known to the naturalist the smaller individuals' habits have tended to remain ignored, or at least perfunctorily recorded, with the result that information is sometimes vague and even conflicting.

Cold weather certainly curtails activity, but there is saprophagous work done during the coldest of seasons. Again, my records bear out Walsh's contention that ' there is a considerable movement of these coleoptera from place to place, as otherwise it is obvious that the traps would speedily have exhausted the beetle fauna in their own immediate neighbourhood.' The truth of the last cannot be more concretely proved than by reference to the omnipresent *Pterostichus madidus*.

Acknowledgments

Best thanks are due to Mr. G. B. Walsh, who verified a number of the captures made and whose assistance to me in the preparation of this paper has in no small measure made it possible ; to Dr. K. G. Blair, who authenticated most of the Staphylinidæ recorded ; and to Mr. P. Harwood, who also checked over a number of specimens taken from the traps.

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NOTE ON METHODS OF KILLING WHALES

The following note appears in *Science Abstracts* (Section B) *Electrical Engineering*, Vol. 43, No. 507, p. 123 : ' Electric Killing of Whales, by A. Weber. The usual method of killing whales by means of harpoons with explosive heads has many disadvantages. It is uncertain, often slow, and many whales sink and are lost. Further, the fragments of the bomb render the conversion of the body into various products more difficult. Electric killing is almost instantaneous and the bodies always float. The usual method is to connect a lead to the harpoon and to pass a current of some 40 A. through the body, the return circuit being through the water and the hull or propeller of the boat. Alternating and direct current are equally efficient, but usually a.c. of 50 c./s at about 200 V. is used. The author describes experiments to determine the voltage and current required for killing with shots in different parts of the body and investigates the voltage drops due to the resistance of the body and the resistance at the surface of the harpoon. The results are given in tabular form.'

THE NOCTULE

BRIAN VESEY-FITZGERALD, F.L.S.

THE largest of our British bats is the noctule, whose specific name is *Nyctalus noctula*. In England it is more or less distributed as far north as the Lake District and Durham—it also is to be found in every country in Wales and, though rarely, in certain districts in Scotland—but is common only south of the Thames. In Ireland and the Isle of Man it is unknown.

Daubenton was the first naturalist to notice this fine animal. He described it and illustrated the head as long ago as 1759, and Buffon subsequently mentioned it in his work. The first reference to it as a British species is in Gilbert White's *Natural History of Selborne*, in which it is recorded three times. Other British naturalists were quick to follow White, and we find the Great Bat described more or less accurately (generally the latter) in the works of Pennant, Bingley, Donovan, Fleming, and Jenyns. Bell described it in both editions of his work. He was himself a resident of Selborne and no doubt observed it on the same ground on which it first attracted the attention of Gilbert White. Later, a number of naturalists, among them George Daniell, George Dowker and John Woolley, T. A. Coward, Arthur Whitaker and Mr. Charles Oldham (notably the last named) devoted some attention to it. Its habits should, therefore, be fairly well known. Unfortunately such information as has been gathered, and that is a considerable amount all told, is hidden away in the transactions, proceedings and so forth of learned societies and local field clubs, and is quite inaccessible to the general public.

It would seem that the noctule is extending its range. Gilbert White speaks of it as rare at Selborne (where it is now common) and gave it a flying season very much shorter than it enjoys at present. It was not known as a Scottish species until quite recently, though elsewhere in its range it occupies territory very much colder than anywhere in Scotland. It does not seem unreasonable therefore to presume that it had only just re-established itself in England (its remains have been found in cave deposits of the Pleistocene age) at the time when Gilbert White wrote, was not then fully acclimatised, and that since that day it has gradually spread westwards and northwards. It is an exceptionally strong flier and there seems to be no reason why it should not eventually establish itself in Ireland, if indeed it has not already done so. It would be easy for it to do so and remain undetected.

The noctule is heavily built, with massive forearms, short and thick lower legs, and very broad and powerful feet. The

wings, however, are long and slender—the wing span is almost fourteen inches—their narrowness being due to the short fifth finger. The fur is long and soft, golden brown above and very slightly paler below. The wing-membrane and the foot are. blackish, and the lips, ears and nose are a dusky greyish-black. The brightest colours are attained just before hibernation—that is, in the breeding season—and the richest colouring is possessed by old males. In the spring, after hibernation, the coat is in very poor condition and is considerably faded : but I have found no trace of moult. Variations in colour are not common. There are records of specimens pied with grey and with black, and also of individuals with a lighter colouring round the neck. Personally, I have knowledge of colour variation in two individuals only, both males and both black. In these two cases—and they were both jet black—the fur was, as is usual with the species as a whole, beautifully soft and thick, resembling a fine old pile velvet. These were definite examples of variation in colour, but, in general, variation in the coat is one of texture and not of colour, and is brought about by good feeding in the summer months.

As we might expect from the shape of the wings, the flight of the noctule is straight and rapid and dashing, not at all unlike that of the swift, and is usually conducted at a considerable height. The noctule may frequently be seen hunting in company with swifts, with whom it is very well able to hold its own. The flight is very nearly as fast, and when it comes to a sudden swoop or turn the bat's greater agility and greater mastery of the air is very evident. But whereas swifts climb higher as the light fades, the noctule seeks a lower elevation and in the late evening hunts at a height of about twenty feet. No hard and fast rule can, however, be laid down. The noctule is not tied to habit. I have seen one in the early evening skimming low over a tarmac road, and frequently in the early evening I have seen them swooping low over a stream. But the noctule is in its full glory on those fine midsummer evenings when the cockchafers are humming on every side. Then it flies high and straight, uttering its shrill cry and interrupting itself only for as long as is needed to capture and dispose of some insect.

If you watch the noctule during this midsummer period you will notice that every few yards it drops some six feet or so, somewhat after the manner of a tumbler pigeon. This drop, as I have very well observed, is executed with the wings extended and is oblique. It is a hawk-like swoop upon insects below and slightly off the line of flight. It is not a vertical fall such as would be caused by a temporary

loss of balance, as would be the case if the thumb were to be used to hold some particularly intractable insect, or if (as is the case with Daubenton's bat) the insect were pouched in the interfemoral membrane for the purpose of mastication. I do not, indeed, believe that the interfemoral pouch, which is the mainstay of the smaller species, is ever used by the noctule. The noctule is so strong that it is easily able to capture and masticate beetles. That broad muzzle, those powerful jaws, are more than equal to the rapid subjection of the larger species, such as the dor-beetle and the cockchafer, of which the noctule is inordinately fond. The hard, horny elytra are cut off and rejected, and I have found scores of these on a favourite feeding ground, including more than once specimens of considerable rarity. Besides beetles the noctule eats moths and any lesser insects that may happen to cross its path. The quantity of insects consumed by each noctule is immense. The elder J. H. Gurney stated that he knew of one that devoured thirty cockchafers in half an hour, and even that rate of consumption is, I should imagine, frequently exceeded. As might be expected digestion is extremely rapid, and the stomach contents of noctules that I have examined—even of those taken on the feeding grounds—have always been very disintegrated.

The swoop of the noctule to which I referred above, and which, by the way, I have observed only in midsummer, is of amazing force. I once saw one come into collison, an astonishing occurrence, during one of these swoops with a serotine, and with such force that both came tumbling to the ground. When I found them both were dead.

The noctule is a tree-loving species and is to be found in the greatest numbers where there are sufficient old trees to provide it with resting places. Captain C. W. R. Knight in his *Wild Life in the Tree Tops* says that he has never found it in other than beech trees. Personally, I have noticed no preference for any particular tree, for I have found colonies in oak, elm, ash, beech, yew and sycamore. Moreover, though primarily an arboreal species, the noctule does not distain buildings. It is curious that so eminent a naturalist as Bell should have maintained that buildings were never used during the day, for I have myself found noctules under the eaves during the daytime on several occasions.

Whatever site is chosen, large colonies sometimes gather together. Pennant states that he was informed by the Rev. Dr. Buckhouse that he saw taken from under the eaves of Queen's College, Cambridge, one hundred and eighty-five in one night, and a further sixty-three on the following night ; and H. B. Booth has related how from a colony at King's Lynn nearly three hundred were seen to emerge for their

evening flight. I have not myself been fortunate enough to find a colony of more than forty-five individuals.

The noctule seeks its winter quarters in buildings or ruins—this is, I think, an almost invariable rule—and from these quarters it issues forth nightly for some days, perhaps for as long as a fortnight, in the spring before forsaking them for the trees, returning for its hibernation to the more solid protection provided by the labour of mankind. Roughly speaking, the sexes are together from the middle of September until the end of May. During the summer, though they may fly together, the sexes do not cohabit. I have found this to be an almost invariable rule—and it was also the experience of the observers of the last century. There are always exceptions. Thus, I have found on one occasion (in June) seven males and one female together, and on another (in July) fourteen females, twelve with young, and one male together in the same den : and Whitaker found a colony in June consisting of eleven males, two females, and one young male aged about ten days. Segregation of the sexes from May coincides with the birth of the young (though virgin females may associate with those that are pregnant), and the segregation is complete in that the colonies may live a considerable distance apart. During the month of August the colonies not infrequently appear to break up, the individuals indulging in a short and solitary camping out season. I have found dens that were occupied in July deserted in August, and I have also in the latter month found solitary noctules clinging to the ivy of houses. In September the sexes come together again for the breeding season, but during hibernation segregation of the sexes is continued, although then both may be under the same roof and may be separated by no more than a few inches. Thus intimate association between the sexes is confined usually to the breeding season and to the spring months.

The holes, in which these bats live during the summer, often have the entrances polished smooth by the frequent comings and goings of the residents. It is most interesting to watch a colony leaving its den on a summer evening. First of all, there is a good deal of squeaking inside the hole, and this may last for as long as four minutes (the longest period that I have timed) but is usually limited to something like a minute. Then a noctule appears at the entrance, pauses momentarily, and then launches himself into the air, to be followed in quick succession by two, three, four, or five more, the number varying with the size of the colony. Then silence for a while : then more squeaking, and the process is repeated again. On leaving the hole the party flies off determinedly to the feeding ground, and each party takes the same direction, though the direction may vary from evening

to evening, and usually does do so : but on occasions I have found parties leaving in different directions. H. B. Booth, who called these parties ' families,' found that on leaving the hole each individual dashed off in a different direction. But in a fairly long experience of this animal I have not yet found that to happen, not even on a single evening. ' Family ' is, by the way, a bad description, for, as I shall show, family life is unknown in noctules, and the male at any rate would be quite unable to recognise its offspring : hence my use of the word ' party.'

The squeaking preliminary to leaving the den is interesting. There must be some significance, but a satisfactory explanation is hard to find. Possibly the bats are aware of a human presence ; possibly the squeaks are merely manifestations of excitement and anticipation. I think it more probable that they are the protestations of those bats over whose bodies the departing party is moving to the entrance. Similarly, the departure by parties is very difficult of explanation. While the bats do undoubtedly leave their holes in parties, I have not observed any signs of the party system on the actual feeding ground, nor in the return to the den. Nor do the parties that leave the hole appear to have a leader. It seems to me that the make-up of any particular party is quite accidental ; that the only attachment is that of time. I believe that the explanation lies in the fact that awakening hunger rouses a certain, but variable, number of the inmates at the same time. And this explanation is, I think, supported by the time at which the noctule leaves the den. This varies very considerably, even on consecutive evenings, and bears no relation to the hour of sunset. While the weather and the temperature undoubtedly play their parts in determining the hour of departure, the governing feature is hunger. Mr. Charles Oldham found that the times at which the first bat issued from the hole varied from twenty-eight minutes after sunset on April 21st to seven minutes before sunset on August 14th. Personally, I have found the times to vary between thirty-seven minutes after sunset on April 21st to twenty-four minutes before sunset on September 12th. As the evenings draw in, the time for the evening flight becomes earlier and earlier, but this is due not so much to the hour of sunset as to the flight-time of the insects who must provide the evening meal.

(*To be continued*)

The Entomologist for March contains ' *Lysandra coridon* Poda var. *syngrapha* Keff.,' by S. G. Castle Russell ; ' A few comments on some inconsistent criticism,' by B. C. S. Warren ; ' Migration Records, 1940,' by Capt. T. Dannreuther ; ' The systematic position of *Mnesipatris filicivora* Meyrick,' by A. E. Wright ; ' Liberation of butterflies,' by Lt.-Col. N. Eliot ; ' *Brephos parthenias* ; female genitalia,' by F. N. Pierce ; and numerous notes and observations.

A LIST OF ALGÆ FROM THE SHEFFIELD DISTRICT

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THE following list of algæ occurring in the Sheffield district represents the result of collecting in the area for a number of years. It makes no claim to be exhaustive as there are still many localities to be explored, but it is published in the hope that it may induce others to add new records to the local algal flora.

Owing to the peculiar geographical position of Sheffield, the collecting grounds lie in Yorkshire, Derbyshire, and Nottinghamshire. The district offers a wide variety of habitat ranging from the acid Sphagnum pools of the moors through the neutral or slightly calcareous ponds of the agricultural districts to the highly calcareous waters of the carboniferous limestone of Derbyshire and the magnesium limestone to the east of the city. A list of the localities from which collections were made is given below, together with abbreviations used to indicate them in the list of algæ. Most of them were ponds and streams and the algæ were collected without the use of a plankton net. It is hoped that a list of plankton species from the reservoirs and larger bodies of water may be published later.

The classification used is that given in Fritsch and West's *British Freshwater Algæ*. Only the commoner species are given in such groups as the Bacillariales, Cryptophyceæ, Chrysophyceæ and some genera of the Myxophyceæ. The addition of others must be left to the specialists in these groups. The figures indicated the month in which the collection was made.

List of Localities

Non-calcareous

Burbage	=Sphagnum pools near Burbage stream below Foxhouse.
R.	=Sphagnum pools near road between Ringinglowe and Burbage Bridge.
L.	=The fishpond, Longshawe Estate.
Mag Clough	=Lily pond in private grounds.
W.	=Whiteley woods, stream and dams.
Dore	=Horse troughs in the village.
Dam Flask	=Dam Flask Reservoir (permit required).
Redmires	=Redmires lower reservoir (permit required).
Bretton Clough	=Stream above footbridge.

Slightly Calcareous

F.	=Mill dam and ponds in Ford Valley.
B.	=Ponds behind Beauchief Abbey.
Q.	=Pools in grounds of Abbeydale Hall.
G.	=Weir and lake in Graves Park.

Calcareous

S.	=Ponds and streams in land of Shireoaks Hall.
H.	=Reservoir and pond near Harthill.
Calver	=Pond near Hassop road.
Barlborough	=Ponds in grounds of Barlborough Hall
Lathkill	=Stream in Lathkill Dale.

Special attention is drawn to the following species in the list :

Glæotænium Loitlesbergerianum Hansg. is a rare alga not previously recorded for England, though described by Harris in 1936 from Glamorganshire (1).

Prasiola fluviatilis Aresch. is an interesting and uncommon alga which appears regularly in the artificial outflow channel from the small ponds in the grounds of Abbeydale Hall.

Euglena sanguinea Ehrenb. caused a conspicuous red bloom on the lower pond at Beauchief in the summers of 1934 to 1937 but has not appeared since.

E. mutabilis Schmitz. was first described in this country by Lund from Richmond Park and later from Burbage, where it is frequent in the Sphagnum pools (2).

Phacus agilis Skuja. was also recorded by Lund from Richmond Park and from a pond near Rivelin Dams, Both this and *E. mutabilis* are probably quite common but had hitherto escaped observation.

Gymnodinium æruginosum Stein., conspicuous for its blue-green chromatophores, is another alga which, although till recently only known from Warwickshire, has now been recorded for many parts of the country (3). It is a regular constituent of the Beauchief plankton favouring especially the part of the pond near the inflow.

Uroglena soniaca Conrad. is a species previously recorded only from Belgium. It made its first appearance at Beauchief and in Belgium in 1938 and has not been seen since at Beauchief. It is remarkable for its peculiar globular, hooked cysts (4).

Volvocales

Chlamydomonas spp. B., F., A., etc.
Gonium pectorale Müller. F. (6), B. (9).
Pandorina morum Bory. F. (9), B. (8), S. (12).
Eudorina elegans Ehrenb. F. (11), B. (5), S.
Carteria multifilis Dill. F. (6), B. (9).
Volvox aureus Ehrenb. F. (9), B. (9), G. (10), Dam Flask (10).
Sphærocystis Schrœteri Chodat. S., H. (7), Redmires (11), Dam Flask (10).
Schizochlamys delicatula West. L., Dam Flask (10).
Tetraspora gelatinosa (Vauch.) Desv. Burbage.
Apiocystis Brauniana Næg. F.

Chlorococcales

Pediastrum duplex Meyen. B. (12), H. (7).
P. duplex var. *clathratum* (A. Br.) Lagerh. H., B.
P. tetras (Ehrenb.) Ralfs. F. (9).
Ankistrodesmus falcatus (Corda) Ralfs. F. (9), B. (9).
Selenastrum gracile Reinsch. L.
Kirchneriella obesa W. West. B.
K. lunaris (Kirchn.) Moeb. B. (8).
Dictyosphærium pulchellum Wood. Calver (10), B. top pond (7).
Crucigenia rectangularis (Næg.) Gay. S., H.
Scenedesmus obliquus (Turpin) Kütz. F. (9).
Glœotænium Loitlesbergerianum Hansg. S. (in jars).

Ulotrichales

Ulothrix zonata Kütz. S. (near ford) (4), Bretton Clough (3).
U. variabilis Kütz. S. (3) on pond outflow.
U. tenerrima Kütz. S. (1), B. (11-3).
U. rorida Thüret. G. (10-3), F. (11-3) stream.
Hormidium rivulare Kütz. B. stream (2).
H. subtile Heering. B. stream.
Enteromorpha intestinalis (L.) Link. S., H. (9).

Microspora amœna Rabenh. B. (3, 6, 12), Lathkill.
M. floccosa Thür. B. (1), R. (11).
Prasiola crispa Menegh. D. on wall.
P. fluviatilis Aresch. A.
Chætomorpha linum (O. F. Mull.) Kütz. Trough, Broad Elms Lane (10).
Rhizoclonium hieroglyphicum Kütz. F., B., etc., common.
R. hieroglyphicum var. *tortuosum* Kütz. F. on weir.
Cladophora glomerata Kütz. F., S., W., etc., C. in streams (4-9).
C. fracta Kütz. F., B., etc., C. in ponds (6-8).

CHÆTOPHORALES

Stigeoclonium tenue. B. (12, 2), A., ditch by road (11).
Draparnaldia glomerata Ag. Burbage (9) stream by tower.
D. plumosa Ag. W. stream.
Chætophora pisiformis Ag. B. (4) on grass stems.
Microthamnion Kutzingianum Naeg. R.
M. strictissimum Rabenh. R. (11).
Aphanochæte repens A. Br. B., F., on other algae.
Trentepohlia aurea Mart. B., rocks beside stream.
Coleochæte scutata Breb. B. (5) on Elodea, S.
Pleurococcus Nagelii Chodat. Common on trees.

ŒDOGONIALES

Œdogonium varians Wittr. S. (6) reproducing.
Œ. macrandrium Wittr. S. (6) reproducing.
Œ. tapeinosporum Wittr. S. (6) reproducing.
Œ. capilliforme Kütz. B. (6), F. (7) reproducing.
Œ. cardiacum Wittr. F. (5) reproducing.
Œ. Braunii Kütz. B. (6) reproducing.
Bulbochæte sp. S. on Chara, B. on Elodea.

CONJUGATEÆ

Spirogyra setiformis (Roth) Kütz. F., Barlborough.
S. decimina (Müll.) Kütz. F., B., Barlborough.
S. reticulata Nordst. F.
S. crassa Kütz. H.
S. neglecta (Hass) Kütz. B. (6-9).
S. Juergensii Kütz. F. (4-5).
S. Spreeiana Rabenh. F. (5).
S. Weberi Kütz. F., Barlborough (6).
S. varians Kütz. F., B., etc. (5, 6).
S. gracilis Kütz. B.
S. calospora Cleve. F. (6).
S. tenuissima (Hans.) Kütz. B. (4).
Zygnema sp. S., H.
Mougeotia spp. Ponds and streams (common).
Spirotænia condensata Breb. Burbage.
Cylindrocystis Brebissonii Mengh. Burbage.
Netrium oblongum (de Bary, Lutkem). Burbage.
N. oblongum var. *cylindricum* W. and G. S. West. Pools on Eyam Moor
N. Digitus (Ehrenb.) Itzigs and Rothe. Burbage.
Gonatozygon monotænium De Bary. Redmires (11).
Closterium acerosum (Schrank.) Ehrenb. F. (9), B.
C. acerosum var. *elongatum* Breb. F., H.
C. acerosum var. *minus* Hantzch. F. (11).
C. lanceolatum Kütz. H.
C. prælongum Breb. F. (11).
C. Jarvulum Naeg. Burbage.
C. cornu Ehrenb. Burbage.
C. Ehrenbergii Mengh. F. (10), H. (9).
C. Malinvernianum De Not. F.
C. rostratum Ehrenb. Mag Clough.

C. decorum Breb. F. (12), Burbage (10).
C. subulatum (Kütz.) Breb. L.
C. juncidum Ralfs. Mag Clough (9).
C. lineatum Ehrenb. B.
C. Venus Kütz. B., Mag Clough (9).
C. monoliferum (Bory.) Ehrenb. B. (9), S.
C. Leibleinii Kütz. F., S.
C. pronum Breb. S.
C. aciculare var. *subpronum* West. S.
C. gracile Breb. Mag Clough (10).
C. jenneri Ralfs. B. (5).
Pleurotænium Trabecula (Ehrenb.) Nag. F. (9).
P. coronatum (Breb.) Rabenh. Redmires (11).
Tetmemorus lævis (Kütz.) Ralfs. Burbage.
Euastrum elegans (Breb.) Kütz. Burbage, below road.
E. oblongum (Grev.) Ralfs. Burbage.
E. dubium Naeg. Burbage.
Micrasterias denticulata Breb. Burbage.
M. americana (Ehrenb.) Ralfs. Mag Clough.
Cosmarium undulatum Corda. S. (7).
C. Subcucumis Schmidle. Burbage (10.)
C. reniforme (Ralfs.) Arch. Calver (9).
C. tetragonum (Nag.) Arch. Burbage below road.
C. Botrytis (Bory.) Menegh. S. (6).
C. margaritiferum Menegh. Burbage below road.
C. Meneghinii Breb. B. (9).
Arthrodesmus Incus f. *minor* West and G. S. West. Burbage (9).
Staurastrum pyramidatum West. Burbage.
S. punctulatum Breb. Burbage.
S. paradoxum var. *parvum* West. B. top pond (7).
S. muticum Breb. Burbage (5).

Siphonales

Vaucheria spp. F., S., Lathkill, etc. (common).

Heterokontæ

Tribonema bombycinum (Ag.) Derb. et Sol. F. (9), B.

Chrysophyceæ

Chrysococcus rufescens Klebs. B. (4).
Mallomonas spp. B. (3), Dam Flask (10).
Uroglena soniaca Conrad. B. (5 and 6).
Synura uvella Ehrenb. F. (5), B. (3-5), H. (12).
Dinobryon divergens Imhof. B. (5), Redmires (11), H.
Anthophysa vegetans (O.F.M.) Stein. B. (11), F. (11).

Cryptophyceæ

Cryptomonas ovata Ehrenb. F. (11).
Chroomonas Nordstettii Hansgirg. B. (3).

Basillariales (Diatomales)

Meridion circulare Agardh. B.
Diatoma vulgaris Bory. B. (9).
Fragillaria capucina Desmaz. B. (9-11), F. (1), H. (10-12).
Synedra Ulna (Nitzsch.). B., F. (9-2).
S. Acus (Kütz.) Gryn. B., F. (9-2).
S. pulchella Kütz. B., F. (9-2).
S. capitata. F., S. (12).
Cocconeis placentula (Ehrenb.). F. (11).
Navicula radiosa Kütz. F. (11), B. (11).
Gyrosigma acuminatum Kütz. F. (10).
Gomphonema constrictum Ehr. B.
G. acuminatum Ehr. B.

Cymbella Cistula (Hemprich.) Gran. F. (2), B. (11).
C. lanceolata Ehr. B. (11).
Nitzschia sigmoidea (Ehr.) W. Smith. F. (10), H.
N. acicularis W. Smith. F. (10).
N. palea (Kütz.) W. Smith. F. (11).
Cymatopleura solea (Breb.) W. Smith. F.
Surirella biseriata var. *constricta* Grün. F. (11).
S. robusta var. *splendida* (Ehr.) van Heurck. F. (11).
Melosira varians C. A. Ag. F. (1), B. (11), auxospores.
Cyclotella operculata (Ag.) Kütz. F. (9), S. (12).
Astericnella formosa Hass. H., S. (9), Dam Flask (10).

DINOPHYCEÆ

Hemidinium nasutum Stein. F. (2).
Gymnodinium æruginosum Stein. F., B. (6, 11).
Glenodinium neglectum Schill. F. (11).
Peridinium Willei Huitfeld-Kaas. S. (7), H. pond near reservoir (7).
P. cinctum Ehrenb. F. (9), H. pond near reservoir (7).
Ceratium cornutum Clap. and Lachm. H. pond near reservoir (7).

EUGLENINEÆ

Euglena acus Ehrenb. F.
E. oxyuris Schmarda. F. (11).
E. mutabilis Schmitz. Burbage.
E. polymorpha Dang. F. (9).
E. sanguinea Ehrenb. B. (6-8).
E. spirogyra var. *abrupti-acuminata*. S.
Phacus pleuronectes (O.F.M.) Duj. F. (9).
P. caudata Hübner. B. (6).
P. longicauda (Ehrenb.) Duj. F.
P. triqueter (Ehrenb.) Duj. B.
P. brevicaudata (Klebs.) Lemm. F. (9).
P. oscillans Klebs. F. B.
P. agilis Skuja. Pond near Rivelin Dams.
Trachelomonas hispida (Perty.) Stein. F. (9).
T. euchlora (Ehrenb.) Lemm. F. (9).
T. volvocina (Ehrenb.). F. (9), B. (8).

RHODOPHYCEÆ

Chantransia violacea Kütz. F. stream.
Lemanea mamillosa Kütz. F. stream (4), Bretton Clough.
Batrachospermum moniliforme Roth. S. stream above ponds.

MYXOPHYCEÆ

Aphanothece stagnina (Sprenger) A. Br. H.
Merismopedia glauca (Ehrenb.) Nag. H., S., Dam Flask (10), W.
M. elegans A. Br. H.
Microcystis sp. F. (9).
Chrococcus giganteus W. West. Spagnum pool, Surprise.
Oscillatoria tenuis Ag. F. (9), B. (4), etc.
Oscillatoria spp. Common.
Nostoc sphæricum Vaucher. Lathkill Dale.
Anabæna constricta (Szafer) Geitler. Barlborough, etc.
A. Levanderi Lemm. B. top pond (10).
Plectonema Tomasinianum (Kütz.) Bornet. Lathkill Dale.
Glœotrichia natans (Hedwig) Rabenh. H. pond near reservoir.

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ENTOMOLOGY AROUND ROBIN HOOD'S BAY

JAMES M. BROWN, B.Sc., F.R.E.S.

DURING the past three seasons which have elapsed since my last communication under the above title (*Naturalist*, 1938, pp. 201-206) a considerable amount of collecting has been done, notwithstanding the restrictions of the past year. Perhaps the most noticable feature has been the comparative scarcity, specially during 1940, of those orders whose members pass their immature stages in water, viz. Stoneflies, Mayflies and Caddisflies. Perhaps the severity of the winter of 1939-1940, when several streams in the district were frozen over, may partly account for this.

One Homopteron (*Criomorphus moestus*) and two Psocids (*Peripsocus parvulus* and *Nymphopsocus destructor*) are additions to the county lists since my last paper, and a number of species are additions to V.C. 62.

County additions †; Vice-County 62 additions *.

HEMIPTERA

Hemiptera have been fairly plentiful during the past three seasons, and considerable attention has been devoted to them with the result that a good number of species not previously listed for the district have been taken. Many of these are quite common species but should be recorded, while some are distinctly rarer forms, several being new to V.C. 62, and at least one Homopteron being an addition to the county list.

(*a*) HETEROPTERA

Pentatoma rufipes L. still appears to be the most plentiful Shieldbug about here, now obtained at Fylinghall, 13/7/40.

Acanthosoma hæmorrhoidale L. This very conspicuous species has not been taken here previously, but during the 1940 season was quite abundant on Hawthorn, both as nymphs and adults. Fylinghall, 29/8/40. Brockets, 30/7/40, 18/9/40 (on both dates nymphs and adults).

Stygnocoris pedestris Fall. at plant roots, Brockets, 12/8/40.

**Taphropeltus contractus* H.S. One specimen at Ravenscar, 13/6/38.

Velia currens F. A very common species everywhere, Fylinghall, 6/5/40. Maw Wyke, 20/5/40, etc.

Gerris thoracicus Schm. Stoupe Beck, 27/5/40.

G. gibbifer Schm. Very plentiful on pools and slow streams, Cliffs, 14/5/40. Mossy Mere, 17/5/40. Maw Wyke, 20/5/40. Stoupe Beck, 27/5/40. Fylinghall, 13/7/40.

Aptus major Cost. Cliffs (R.H. Bay), 3/8/40.

Reduviolus flavomarginatus Sch. Ramsdale, 27/7/39.

R. rugosus L. Raw, 12/5/40. Cliffs, 15/6/40.

Dolichonabis limbatus Dahlb. Ramsdale, 12/8/40. Raw, 12/8/40; and the rare long-winged form at Ramsdale, 23/7/40.

Chartoscirta cincta H.S. One specimen, Maw Wyke, 20/5/40.

Temnostethus pusillus H.S. Very plentiful on tree trunks, especially on Beech and Sycamore, Brockets, 30/7/40, 1/10/40. Park Gate, 4/9/40, 13/9/40, including a long-winged individual.

Microphysa elegantula Baer, also plentiful on trunks at Park Gate, 28/8/40, 4/9/40, 16/9/40, all the specimens taken being females.

Pithanus maerkeli H.S. A species not very plentiful about the district. Maw Wyke, 5/7/38. Hawdale, 13/7/40.

Trigonotylus ruficornis Fall. A common species among grass, Maw Wyke, 5/7/38. Ramsdale, 26/7/39. Thorny Brow, 26/6/40. Howdale, 12/7/40.

Miris dolobratus L. Among grass, Thorny Brow, 20/6/40. Howdale, 13/7/40.

M. ferrugatus Fall., in similar situations, Brockets, 21/6/38. Thorny Brow, 26/6/40. Howdale, 13/7/40.

Pantilius tunicatus F. A late species on Hazel and Alder, Brockets, 18/9/40, 9/10/40, 12/11/40.

Phytocoris tiliæ F. Ramsdale, 23/7/40.

P. pini Kb. Ramsdale, 23/7/40.

P. ulmi L. Brockets, 1/8/40, 7/8/40.

Calocoris sexguttatus F. Ramsdale, 23/7/40.

C. alpestris Mey. A less common species taken again in Oxbank Wood, 25/6/38, 12/6/40.

Pycnopterna striata L. A very conspicuous species found on Oaks, Oxbank Wood, 25/6/38, 12/6/40. Ramsdale, 11/6/40.

Plesiocoris rugicollis Fall. On Sallows, Fylinghall, 13/7/40.

Capsus ater L. A conspicuous species not previously noted in the district, Middlewood Lane, 17/7/39. Oxbank Wood, 12/6/40.

Campyloneura virgula H.S. A delicate species on Oaks, Brockets, 30/7/40. Ramsdale, 23/7/40.

**Globiceps dispar* Boh. One of the rarer species obtained low down among Rushes, Raw, 13/8/40, previously taken at Wharncliffe.

Mecomma ambulans Fall. Brockets, 1/8/40. Raw, 13/8/40 (along with the last).

Cyrtorrhinus caricis Boh., with the last two species, Raw, 13/8/40.

**Orthotylus prasinus* Fall. On Elms, Brockets, 30/7/40, the second Yorkshire locality.

O. ericetorum Fall. among *Calluna*, Raw, 12/8/40. Ramsdale, 30/7/40.

Heterotoma merioptera Scop. One specimen of this not very common species on Mint in the garden, 13/8/40.

**Byrsoptera rufifrons* Fall. Another less common species, Ramsdale, 3/7/38.

Phylus coryli var. *avellanæ* Mey. Brockets, 30/7/40.

Psallus lepidus Fieb. On Ash, Spring Hill, 21/6/40.

Atractotomus magnicornis Fall. On Pines, Ramsdale, 23/7/40.

Plagiognathus arbustorum F. A common species especially on nettles, etc. Ramsdale, 23/7/40.

P. chrysanthemi Wolff. Stoupe Beck, 22/6/38.

Corixa punctata Ill. (*geoffroyi* Lch.). Evan Howe Pond, 14/5/40. Farm Pool, Mill Beck Lane.

Sigara lateralis Lch. (*hieroglyphica* Duf.) with the last.

**S. sahlbergi* Fieb. Howdale.

S. linnæi Fieb. Pool on the cliffs, 16/4/40.

S. moesta Fieb. with the last, 16/4/40. Three specimens were netted together, and no further specimens were seen.

S. nigrolineata Fieb. Plentiful in most pools, Cliffs, 16/4/40. Evan How Pond, 14/5/40. Mossy Mere, 17/5/40.

Micronecta poweri D. and S. Brockets Beck, 26/4/38, 17/7/39, in enormous numbers in the muddy shallows.

(*b*) Homoptera

The nomenclature used in the following list differs considerably from that used in my previous lists, but it has been modified in accordance with the names suggested for use by W. E. China (*Entom. Mo. Mag.*, 1938, pp. 191-197).

Neophilænus lineatus L. Ramsdale, 23/7/40.

Euacanthus interruptus L. A common species but not previously taken about here. Howdale, 13/7/40. Linger's Steps, 6/9/40. Brockets, 30/7/40. Ramsdale, 28/8/40.

Bythoscopus lanio L. Plentiful on Oaks, Ramsdale, 23/7/40.
Oncopsis alni Schr. Maw Wyke, 24/6/38.
O. rufusculus Fieb. Brockets, 30/7/40.
Aphrodes bicinctus Schr. (*Acocephalus nervosus* Schr.). Brockets, 30/7/40, 1/8/40.
A. bifasciatus L. Plentiful at roots of *Calluna*, Howdale, 13/7/40. Ramsdale, 30/7/40. Raw, 13/8/40.
A. albifrons L. with the last, Raw, 13/8/40.
Eupelix cuspidata Fab. Fairly common at roots of grass, Howdale, 23/8/39. Brockets, 30/7/40. Cliffs, 3/8/40.
Doratura stylata Boh. Among grass, Howdale, 29/8/40.
Euscelis brevipennis Kbm. Cliffs, 3/6/40. Fylinghall, 31/5/40.
E. lineolatus Br. Among grass, Brockets, 26/4/38. Maw Wyke, 5/7/39.
Hardya melanopsis Hdy. Howdale, 13/7/40.
Jassargus (*Deltocephalus*) *distinguendus* Flor. Plentiful in both forms, Maw Wyke, 5/7/38. Linger's Steps, 12/7/40. Brockets, 12/8/40. Howdale, 13/7/40. Cliffs, 3/8/40.
Thamnotettix prasinus Fall. Brockets, 24/6/38.
T. subfusculus Fall. with the last.
Sonronius (*Cicadula*) *dahlbomi* Zett. Fairly plentiful at Brockets, on Bracken, 21/6/38, and for some days after, but not noticed during the last two seasons, previously known from Forge Valley.
Alebra wahlbergi Boh. Brockets, 1/10/40, on Elm.
Dicraneura mollicula Boh. Ramsdale, 19/8/39.
Typhlocyba cratægi Doug. Howdale, 29/8/40, 4/9/40.
Erythroneura flammigera Geoff. Howdale, 29/8/40. Fylinghall, 8/11/40. On Hawthorn.
Kelisia vittipennis Sahlb. Among grass, Brockets.
Conomelus limbatus Fab. Very plentiful at Rush roots, Howdale, 13/7/40. Raw, 13/8/40 and long-winged form, 28/8/40.
Delphacodes pellucida Fab. Fylinghall, 31/5/38. Brockets, 26/4/38, 12/8/38. Oxbank Wood, 12/6/40.
D. discolor Boh. Brockets, 24/6/38. Maw Wyke, 20/5/39. Fylinghall, 31/5/40.
D. obscurella Boh. (*difficilis* Edw.). By sweeping among grass, Brockets, 24/6/38. Maw Wyke, 5/7/38. Fylinghall, 31/5/40.
D. forcipata Boh. Among rough grass, Brockets, 21/6/38. Fylinghall, 31/5/40.
**D. denticauda* Boh. A very much less frequent species, among rough grass, Ramsdale, 1/6/40, only known from Semerdale.
Criomorphus (*Stiroma*) *albomarginata* Curt. Fairly plentiful in grass, Brockets, 21/6/38. Fylinghall, 30/5/40.
†*C. moestus* Boh. A few specimens in rough grass at the edge of the moors, near Ramsdale, 1/6/40, 5/6/40. (*Entom. Mo. Mag.*, 1941, p. 59.) Not previously taken in Yorkshire and only known from Westmorland.

Plecoptera

Although Stoneflies do not seem to have been so much in evidence during the past seasons, four species which I have not taken previously in this district can be listed, and several of the less common species have occurred in fresh localities. It may be noticed that neither of the large *Perla* have yet been obtained.

Perlodes mortoni Klap. Has occurred at Brockets, 26/4/38, 10/5/39, and at Fylinghall, 4/5/40.
Capnia nigra Pict. An early species found as nymphs and adults at Brockets, 12/3/40.

Taeniopteryx risi Mort. Again occurred at Fylinghall, 19/6/39, 22/5/40, and at Brockets, 26/4/38, 27/5/40.
Leuctra moselyi Mort. Not previously found about here, was taken at Brockets, 21/6/38.
L. hippopus Kmpy. Also at Brockets, 26/4/38.
Protonemura precox Mort. Previously obtained at Fylinghall, now occurred at Brockets, 12/3/40.
Amphinemura standfussi Ris. By a small stream in Linger's Fields, 12/7/40.
Nemoura cambrica Steph. Again occurred at Brockets, 26/4/38.
N. avicularis Mort. Also at Brockets, 26/4/38, but not previously noted in the district.
Nemurella inconspicua Pict. Previously obtained at Brockets now at Fylinghall, 31/5/40.

Ephemeroptera

Mayflies seem to me to have been distinctly less plentiful during the last two or three seasons and few swarms have been observed, and very little additional information can be given, one species only being new to my local list.

Ephemera danica Mull. Has been seen in several fresh localities, Fylinghall, 17/6/39, and Brockets, 14/6/38.
**Paraleptophlebia submarginata* Steph. Was taken at Brockets, 3/7/39.
Ephemerella ignita Poda again occurred at Brockets, 3/7/39.
Baetis pumilus Burm. Now taken at Maw Wyke, 12/6/38.
Rhithrogena semicolorata Curt. Seems to be the commonest species about here, Brockets, 26/4/38, 3/7/39. Maw Wyke, 12/6/38.
Heptagenia lateralis Curt. Fylinghall, 23/8/39.
Ecdyonurus venosus F. Bay Town, 21/6/38. Brockets, 27/5/40. Oxbank Wood, 12/6/40.

Trichoptera

Like the Mayflies, the Caddisflies have been scarce, especially during 1940, and only two additional species can be listed.

Drusus annulatus Steph. Was not seen till late in the season at Brockets, 18/9/40, 1/10/40, 15/10/40.
Berœa maurus Curt. Ramsdale, 28/8/40. Fylinghall, 12/7/40.
Tinodes dives Pict. Not previously taken here, occurred at Maw Wyke, 5/7/38.
Plectrocnemia conspersa Curt. was captured within the house, 4/7/39.
Philopotamus montanus Don. Not previously taken here was obtained at Oxbank Wood, 12/6/40.
Wormaldia occipitalis Pict. Brockets, 1/8/40.
Glossosoma boltoni Curt. Previously collected at Ravenscar now at Brockets, 25/6/40, but the more usually common *G. vernale* Pict. has not yet been taken here.

Neuroptera

A few additional localities can be given for species previously taken but only two additional species can be recorded.

Conwentzia psociformis Curt. Taken at Fylinghall, 8/6/40, and Brockets, 30/7/40, beaten from Oak.
Semidalis aleurodiformis Steph. Also from Oak, Brockets, 30/7/40.
Hemerobius humulinus L. Not taken previously, occurred near St. Ives, 1/8/40.
H. simulans Walk. Fylinghall, 8/6/40. Brockets, 25/6/40.

H. stigma Steph. From Scots Pine, Thorny Brow, 20/6/40, an addition to the district.

Kimminsia betulina Strom. Brockets, 18/9/40.

Chrysopa carnea Steph. Frequently taken in hibernation within doors, but not yet captured in the open, 12/38, 12/40.

C. ventralis Curt. Oxbank Wood, 24/6/38.

C. ventralis f. *prasina* Burm. On Oak, Ramsdale, 4/7/38. Brockets, 21/6/38.

Nathanica capitata F. has occurred in several additional localities. Ramsdale, 4/7/38. Fylinghall, 26/6/38. Brockets, 14/6/38.

Mecoptera

Panorpa germanica L. was taken in Linger's Fields, 12/7/40, but *P. communis* L. has not yet been noted.

Psocoptera

One Psocid new to the county and several new to the district and to the vice-county can be added to the lists previously given, and additional localities can be noticed for several less common species.

Metylophorus nebulosus Steph. has again been taken, now in the lane near St. Ives, 1/8/40.

Psococerastis gibbosa Sulz. Previously obtained in the Arncliffe Woods, Egton, has now occurred at Brockets, 30/7/40. This species is known only in V.C. 62.

Trichadenotecnum sexpunctatum L. On Beech trunks, Ramsdale, 13/9/40.

Loensia fasciata Fabr. Brockets, 7/8/40.

L. variegata Latr. On trunks, Ramsdale, 28/8/40. Not so frequent as the preceding species.

Reuterella helvimacula End. The wingless females are very frequent on tree trunks, the winged males less so, Park Gate, 7/10/40, etc.

†*Peripsocus parvulus* K. This species occurred in some numbers, both the full-winged males and the short-winged females on the trunk of a Sycamore tree at Fylinghall on various dates between 28/6/40 and 5/9/40.

Elipsocus cyanops Rost. Brockets, 15/9/40.

**E. abietis* K. was plentiful on Larch at Park Gate, 22/9/40.

Liposcelis divinatorius Mull. is a pest among insects and herbarium specimens. Robin Hood's Bay, 3/10/40, etc.

**Psyllipsocus ramburi* Selys occurs among papers, etc., along with the better known *Trogium pulsatorium* but is less frequent, Robin Hood's Bay, 27/7/39, previously known only from Saltaire.

†*Nymphopsocus destructor* End. occurred within doors, 12/11/40. This is the first record of this species for Yorkshire, but according to Pearman it is probably the wingless form *Psyllipsocus ramburi* (*Entom. Mo. Mag.*, 1935, p. 84).

Trogium pulsatorium L. occurs among papers and books, etc., within doors, 27/7/39.

Hyperetes guestfalicus K. is plentiful and widespread on the trunks of various trees, especially late in the season, Ramsdale, 13/9/40 (on Beech and Sycamore). Brockets, 9/10/40 (on Alder). Linger's Fields, 14/10/40 (on Ash). Robin Hood's Bay Churchyard, 18/10/40 (on Sycamore).

Orthoptera

Five species of Short-horned Grasshoppers have been noted in the district so far, and all of these are common species.

Acridium vittatum Zett. occurs on dry hill sides, Howdale, 17/7/39, and is probably widely dispersed.

Myrmeleotettix maculatus Thun. is plentiful, especially in healthy areas, Thorny Brow, 20/6/40. Howdale, 1/7/38, 23/8/39, 13/7/40. Ramsdale, 30/7/40.

Omocestus viridulus L. is very plentiful in grassy places, Thorny Brow, 20/6/40. Howdale, 17/7/39, 23/8/38, 30/7/49. Brockets, 1/8/40, Cliffs, 3/8/40. Linger's Steps, 12/7/40.

Chorthippus bicolor Charp. Probably the most plentiful and most variable in colour, Thorny Brow, 20/6/40. Linger's steps, 23/8/39, 12/7/40, 13/10/40. Howdale, 23/8/39, 30/7/40. Cliffs, 3/8/40, Ramsdale, 18/8/40.

**C. parallelus* Zett. A species in which the wings and hemielytra are shortened in both sexes. It occurs in grassy places in moorland areas. Howdale, 29/8/40. Raw, 12/8/40.

A Note on Wasps

During the summer a large number of dead wasps were noticed in a local shop window. A sample of these was obtained and a count of the species represented was made on 12/10/40, with the following result :

Of 70 specimens there were	*Vespula vulgaris* L.	... 18
	V. germanica Fab.	... 51
	V. rufa L.	... 1

Urocerus gigas L. (*Sirex gigas* L.) occurred at Thorpe, 10/6/40.

In Memoriam

MATHIAS BYWATER

Mathias Bywater, who died on March 11th, was a Life Member of the Yorkshire Naturalists' Union. He was a simple lover of nature and of the countryside. He dearly loved to watch the birds and to listen to their songs, and to note the wild flowers as they came round. No scientific nomenclature ever troubled him. Until recently he was a frequent attender of the field excursions of the Union. He had a great objection to indoor meetings, partly owing to a slight deafness, but chiefly through his inherent love of the fresh air. It has often been remarked that life membership of the Yorkshire Naturalists' Union is one of the finest forms of life insurance. Mathias Bywater was no exception in this respect, for he lived in fairly good health to the good old age of eighty-eight. A week before his death he had a bad fall in the street, from the shock of which he never properly recovered, and which probably rather hastened his end, but he really died of ripe old age. Unfortunately a sister (Miss Florence Bywater) who had lived with her brother practically all her life, predeceased him by two days, at the age of seventy-six. They were both buried together in the same grave and on the same day, in the North Bierley Cemetery, Low Moor, Bradford. He was educated at Fulneck School, Pudsey, was a bachelor, and was formerly in business as a wool merchant at Bradford. He will be greatly missed by all who knew him—both in recreation and in business.

H. B. B.

GUST, 1941 No. 793

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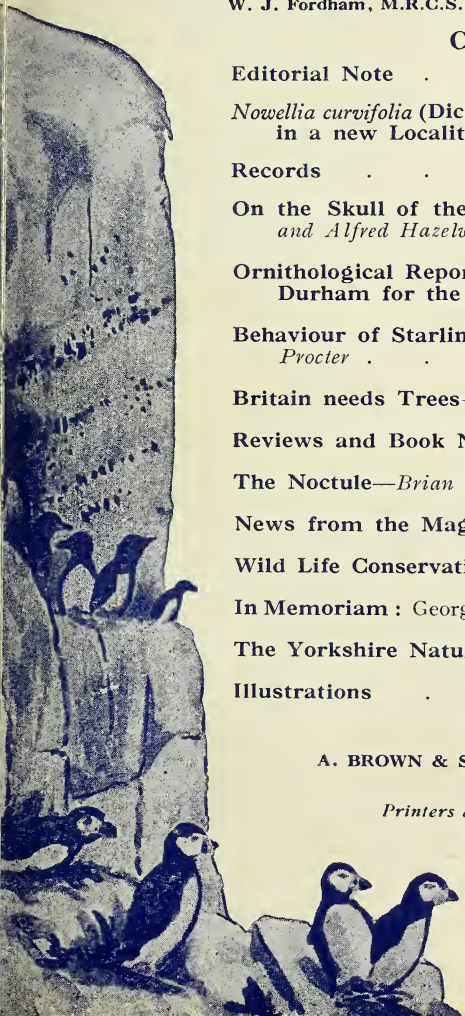

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GEOLOGICAL SECTION

Temporary Sections and Borings Committee

Members and associates of the Union, whether geologists or not, are asked to report immediately to the undersigned all cases of new sections or borings occurring in their districts. These records are of vital importance to the progress of geology in the county.

J. A. BUTTERFIELD, M.Sc., F.G.S. (*Secretary*),
32 Ashfield Drive, Frizinghall, BRADFORD.

EDITORIAL NOTE

We very much regret that our contemporary, *The Vasculum*, has ceased publication for the time being. This means that the valuable work of several North Country ornithologists may possibly go unpublished.

The recorder for Northumberland and Durham, Mr. G. W. Temperley, who is very well known to older members of the Yorkshire Naturalists' Union, has very kindly sent us his summaries of recordings for 1939 and 1940, and these we propose to publish in the pages of *The Naturalist*, the first instalment appearing in this issue.

NOWELLIA CURVIFOLIA (DICKS.) MITT. AND ITS ASSOCIATES IN A NEW LOCALITY

CHRIS. A. CHEETHAM

The hepatic *Nowellia curvifolia* or, as given in the North and West Riding Floras, *Cephalozia curvifolia*, is not known from many localities in Yorkshire and these being mainly in the North Riding. In addition to the three in Lees' *West Yorkshire* it has been found in this Riding at Scotcher Gill, Dent and Bolton Woods in the Valley of Desolation; on a recent visit to Birks Plantation, which is at the upper end of Eldroth Cragg Lane in Austwick Parish and close to Austwick Common, I found it in fair quantity on three fallen rotting conifer trees, the altitude is 900 ft. O.D., the soil damp and somewhat clayey.

The three logs were within 20 yards of each other and though rotting logs were plentiful I did not find any more. Other plants on these logs were *Lophocolea cuspidata* Lpr., *Lepidozia reptans* (L.) Dum. and *Tetraphis pellucida* Hedw., on the soil *Eurhynchium prælongum* var. *Stokesii* Brid. is plentiful with *Pellia epiphylla* (L.) Corda. in the damper parts.

The *Tetraphis* was fruiting on one of the logs and I found it fruiting in several other places in the wood. On p. 125 in *The Naturalist*, 1938, I stated that Feizor Nick, another Austwick Station, was the furthest west that I knew it as a fruiting plant, but since that was written Mr. Milsom and I found it in fine fruit just over the Lancashire border at Botton Mill. Another interesting find in Birks Plantation was *Orthodontium gracile* Schwaeg. var. *Leterocarpum* Wats., which was growing on the base of several of the living trees. The rainfall is probably much higher than that of Austwick village (500 ft. O.D.), which averages 45 in. per annum, the trees are mostly conifers with some hardwoods at the margin, they are well covered with lichens, the most plentiful and showy being *Parmelia physodes* Ach. and *Cladonia macilenta* Hoffm. with *Lobaria lætevirens* A. Zahlbr. on some of the smooth barked species. For an early February visit this wood proved a very interesting place.

RECORDS

SUPPOSED METEORITE AT FILEY

THE press has recently recorded a meteorite at Filey found on the sands by Mr. L. C. Parkin. I had my doubts about this record, and by the kindness of the owner, I have been permitted to see it. As I expected, it proved to be one of the symmetrical nodules of iron pyrites found in the Lias Shales of the Whitby and Robin Hood's Bay district. These nodules are usually lens- or cake-shaped, but the present one is the size of a large cricket ball, and with the exception of a slight 'waist,' is globular, and weighs $4\frac{3}{4}$ lb. There are brasslike crystals of iron pyrites protruding.—T. SHEPPARD.

COLIAS CROCEUS (FOURCROY) THE CLOUDED YELLOW BUTTERFLY IN WEST YORKSHIRE (V.C.64)

WHILE cycling on the Keasden-Wray road near the Green Smithy on June 24th I saw a Clouded Yellow on the wing. It was coming towards me helped by a fairly strong westerly breeze. I turned round and overtook it as it settled, and repeated this three times, getting a good look at it before it left the road for a garden. It was in perfect condition and showed no sign of rough travel. As I turned and went on my way I met another specimen about a mile away from the first. I saw Mr. A. G. Wright, of Grange, on July 2nd, and he told me he had seen none there, but had heard that one had been seen at Morecambe and one at Ulverston. As far as I am aware this is the first time it has been seen here since 1935, when several were caught at Grange and one on Austwick Moss. It may be worth noting that the Painted Lady has been more plentiful this year than I have known it to be previously at Austwick, but none had been seen at Grange when I was there on July 2nd.—CHRIS. A. CHEETHAM.

ABNORMAL DATE FOR REDWING

MR. T. HYDE-PARKER writes: 'Coming up from Hunmanby this afternoon (June 29th) I picked up a dead Redwing. It was quite freshly killed—not yet even stiff—and had apparently been struck by a car.' Is this extraordinary Yorkshire occurrence to be taken as a record of a late migrant, or as an early one? The Handbook gives the latest date for a record for the species as June 27th, 1937 (Sussex), and the earliest arrival as July 5th (Cumberland). Even of these dates one wonders how the records were definitely assigned 'early' or 'late.'—R. C.

ON THE SKULL OF THE BADGER
Meles meles meles Linn.

ELLEN AND ALFRED HAZELWOOD

So often the statement is repeated that ' the lower jaw is articulated to the skull in such a manner that it cannot be

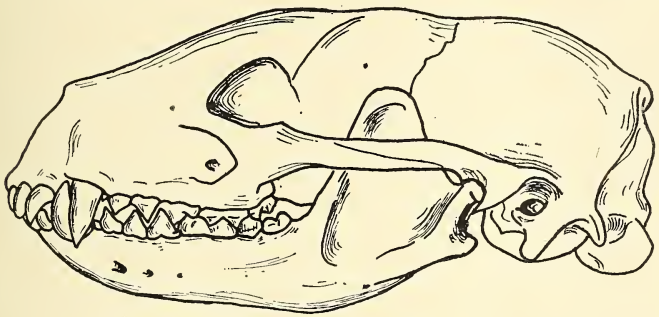

Fig. I. Skull.

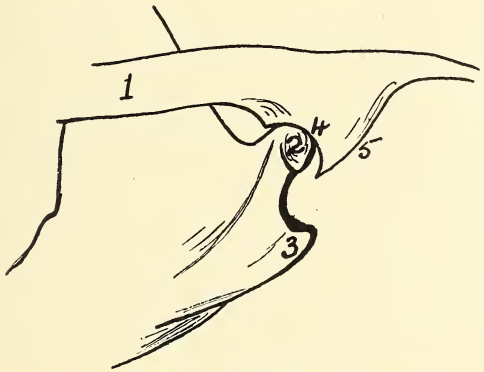

Fig. II. Articulation.

1.—Zygomatic arch. 2.—Mandibular condyle.
3.—Mandibular angular process. 4.—Glenoid cavity.
5.—Squamosal.

dislocated without breaking the skull ' (*Nature by Night* by Arthur R. Thompson, p. 4) that the following notes may perhaps be of interest.

The accompanying sketch is of the skull of a mature sow trapped in Dipton Woods, Hexhamshire, Northumberland, on July 28th, 1938. She had bred that year.

A full description in great detail of the anatomy of the skull and dentition of *Meles meles* can be consulted in *Catalogue of the Mammals of Western Europe* by G. S. Miller, pp. 343 *et seq.*, so it will suffice here to mention only that part which affects the articulation of the lower jaw (mandible).

The *zygomata* are narrow anteriorly, but spread widely posteriorly, the arch being very slightly bowed upward. The glenoid cavity into which the mandibular *condyle* articulates resembles that of most other members of the *Carnivora*. The mandible is heavily built ; the short, thick, angular process lies close to the base of the articular process, and it is this shortening of the interval between the mandibular *condyle* and angular process (*i.e.* the acuteness of the angle between them) which may have given rise to the above quotation.

When the jaws are opened to an angle of 90 deg., the posterior edge of the glenoid cavity locks into the lower, somewhat concave edge of the *condyle*, the angular process of the *ramus* pivotting on the underside of the zygomatic process of the *squamosal*. In life, however, this would be prevented by a riding-off action of the cartilagenous covering of the *condyle*. In effect, in life, the process would seem to limit the extent of gape although the elasticity of the attached ligaments would, by allowing the *condyle* to slip from its socket and so cease to act as a fulcrum, allow the jaw to become dislocated. In old age, denoted by the enormous development of the sagittal crest, it appears that the edges of the glenoid cavity protrude into osseous processes which may even be recurved. The initial flatness of the curve of the glenoid cavity and the straightness of the anterior surface of the articular process are, however, such as to preclude any complete locking action, however far such ossification of the cartilage may proceed.

In conclusion we would point out that this feature of the skull is also present in the skulls of cat and polecat, and especially in pine marten as demonstrated by a skull now in our collection and which was prepared from a male from Keswick in November, 1924.

NEWS FROM THE MAGAZINES

As Wartime Pamphlet No. 16, the Department of Scientific and Industrial Research, Geological Survey of Great Britain, has published ' Geology of the Iron-Ore Field of South Cumberland and Furness,' by K. C. Durham and W. C. C. Rose (26 pp., F'cap, and four maps, 1/3).

The London Naturalist for 1940 is a much smaller volume than usual. It contains ' The Study of Place Names,' by W. G. Cocksedge ; ' Willow Herbs,' by R. W. Robbins ; '*Andrena* and *Nomada* (Hymenoptera, Apidæ) on Hampstead Heath,' by I. H. H. Yarrow ; ' Field Notes on Diptera,' by L. Parmenter ; ' British Butterflies in 1940,' by H. J. Burkill ; ' Plant Gall Records for 1940,' by H. J. Burkill ; ' The Survey of Limpsfield Common, Mammals, Reptiles and Amphibia,' by R. S. R. Fitter, and 'A Spring Census of the Birds,' by L. Parmenter and R. S. R. Fitter. The supplement, ' London Bird Report for 1940,' contains a report on bird life within twenty miles of St. Paul's Cathedral, and special reports on the Sand Martin, Teal and the Common Curlew.

The Naturalist

ORNITHOLOGICAL REPORT FOR NORTHUMBERLAND AND DURHAM FOR THE YEAR 1939

Compiled and abridged from the records of the members of the Ornithological Section of the Natural History Society of Northumberland, Durham, and Newcastle upon Tyne and others, by George W. Temperley. (A key to the initials appearing in these records will be found at the end of these notes. N.=Northumberland. D.=County Durham.)

Classified Notes

Raven.—There were the usual reports of robbed nests this year, but there is evidence that at least one pair in the Cheviot district bred successfully.

Hooded Crow.—Again very few recorded. February 4th, one seen at Boulmer. March 26th, one Cullernose, N. (M.G.R.). During March one seen twice near Warkworth, N. (E.M.). April 10th, one seen at Catcleugh, ' the first seen in Upper Redesdale for several years ' (R.C.). October 23rd, a flock of eight seen near Cramlington, N. (J.A.), the first ' flock ' recorded for many years. A hybrid between a Hooded and Carrion Crow was shot on Hetton House Estate near Chatton, N., on April 17th, and is now in the Hancock Museum (J.M.C.).

Hawfinch.—June 3rd, one seen at Bywell, N. (R.G.). Again seen at various dates at Newton Hall, Stocksfield, N., six on November 11th being the largest number (H.T.).

Goldfinch.—Reported from Upper Redesdale, N. (R.C.), Hexham (E.M.L.), and Warden, N. (G.W.T.). A flock of eight near Broomlee, N., in December (W.R.P.).

Siskin.—March 2nd, one seen near Hexham, N. (G.W.T.). April 18th, five at Catcleugh, N. (R.C.).

Crossbill.—The flock reported near Slaley, N., during the winter of 1937-38 remained throughout the year 1939. No other flocks were reported during the winter of 1938-39 (G.W.T.). On July 20th two were seen at Catcleugh, N. (R.C.).

Snow Bunting.—None have been seen at their usual haunts on the coast near Whitburn, D,, for the last two winters (C.P.).

White Wagtail.—May 11th and 12th, a cock seen at Primrose Hill, Jarrow, D. (H.T.).

Nuthatch.—April 18th, one seen in the garden of a school in Darlington, D. (M.G.R.).

Willow Tit.—Reported to have bred again this year in Gosforth Park (C.J.G.).

Long-tailed Tit.—Several members report that the species was more numerous than usual in the summer and autumn of 1939.

Waxwing.—None was reported in the winters of 1938-39 or 1939-40.

1 Aug. 1941

Lesser Whitethroat.—Reported from Craster, N. (J.M.C.), Alnmouth, N. (F.J.N.), Wylam and Prudhoe in the Tyne valley (W.E.).

Wheatear.—More plentiful in Upper Redesdale, N., than for many years past (R.C.).

Greenland Wheatear.—More plentiful on the Durham coast in the autumn of 1939 than usual (H.M.S.B.).

Redstart.—More numerous in some localities, but apparently still scarce in others. Seen in four places within a square mile at Newton Hall, Stocksfield, N. (H.T.). Reported more plentiful near Ingram, N. (B. Bryant per H.T.). The pair mentioned in the 1938 Report as nesting in a Newcastle garden returned this year, but built in a hole in a wall instead of in the nesting-box (C.A.H.).

Green Woodpecker.—Reported from several new localities in County Durham (J.G. and others).

Little Owl.—July 23rd, one seen at Howick, N. (F.J.N.). August 8th to 18th, a family party at Neasham, near Darlington (M.G.R.).

Short-eared Owl.—Very numerous this summer on the moors in the North Tyne area recently planted by the Forestry Commission. Twenty-one pairs were under observation and four nests were found, while many more were known to be in the neighbourhood (M.G.R.). During November at least six birds were to be seen on the rough ground south of the Team Valley Trading Estate, Gateshead, D. (G.D.S.).

Long-eared Owl.—Also numerous this year in the North Tyne district. Four nests were found (M.G.R.).

White-breasted Barn Owl.—A pair is still breeding at Seaburn, D., but not in the usual chimney (C.P.). On February 13th a female was shot near Berwick ; it had three short-tailed field mice in its stomach. On March 31st a female was killed by a motor car near Greenhead, N. ; its stomach contained two Common Shrews (S.E.C.). On August 7th a juvenile female was trapped by a keeper at Hamsterley, near Whitton-le-Wear, D., ' quite a rare bird now in Mid-Weardale ' (J.G.)—and no wonder if the gamekeepers are destroying these useful birds !

Common Buzzard.—On April 19th a single bird was seen near Deadwater, North Tyne (M.G.R.).

Hen Harrier.—On December 23rd an adult male was seen at Housesteads, N. (W.R.P.).

Osprey.—On May 6th one was shot at Stanhope, D. (J.G.).

Whooper Swan.—As stated in our ' Report for 1938 ' (*The Vasculum*, Vol. XXV, p. 47) there was an unusual influx of Swans, both Whoopers and Bewicks, to the British Isles in the winter of 1938-39 (see *British Birds*, Vol. XXXII, p. 378). The largest number of Whoopers recorded in Northumberland

was at Hallington Reservoir from December 10th to 27th, 1938, when a herd of about 90 was present. About the turn of the year this flock must have broken up or passed on, for none was observed there on January 16th and on subsequent visits. On the loughs north of Bardon Mill, N., there were 40 in December, but these did not remain ; later counts there were : January 15th, 4 ; January 22nd, 18 ; February 5th, 11 ; February 21st, 8 ; March 12th, 7. On February 6th five were seen on flats near Holy Island and three on Budle Bay, N. (W.R.P.) A single adult bird remained on the estuary of the Aln, N., throughout the winter of 1938-39 where it was seen constantly in company with some Mute Swans until April 23rd. It, or another, returned to the same place in the winter of 1939-40 (F.J.N.). In the winter of 1939-40 Whoopers came to Northumberland in even larger numbers. Hallington Reservoir was again their favourite station, as the following figures show : November 6th, 75 ; 19th, 132 ; December 17th, 143 ; 23rd, 133 ; 31st, 100 or more (H.T., F.J.N., and G.W.T.). There are no previous records of a herd of this size in Northumberland. There is evidence that the birds resort to Hallington as a safe preening and roosting station, for they are not observed to feed there. Capheaton Lake is one of their principle feeding places, 70 birds having been counted there at one time, and flocks have been watched arriving at Hallington from the direction of Capheaton. On November 18th 29 birds flew in from that direction and on December 23rd no less than 133 so arrived. There is no evidence as yet as to whether the birds from the Loughs join the Hallington assembly.

Bewick Swan.—The influx of Bewick Swans during the winter of 1938-39 was less noticeable locally than elsewhere in the British Isles. On the Northumberland Loughs in February there were only eight birds and no others were reported therefrom later. On January 1st one spent a short time on the South Park boating lake at Darlington, D. (W.K.R.).

Barnacle Goose.—January 2nd, eight seen at Boulmer, N. (F.J.N.). Two birds were seen at the Farne Islands on June 10th, a most unusual date ! (T.R.G.).

Sheld-duck.—January 7th, two seen on Jarrow slake, D. (H.T.). March 26th, about 60 on Budle Bay, N. (H.T.). On April 11th 14 pairs were counted on the Durham side of the Tees estuary (P.L.H.). On Belford moor, N., six miles from the sea, a family of eight downy young was found walking seaward through the heather until stopped by a stone wall (T.E.H.). August 15th, four young birds on Whittle Reservoirs, N. (H.T.).

Garganey.—April 11th, a pair seen at Teesmouth, D. (P.L.H.).

Pintail.—January 7th, one drake on Jarrow slake, D., and February 4th, two at the same place (H.T.). April 1st and 2nd, one duck at the same place (H.T.). April 7th, a pair on Grindon Lough, N. (R.M.G. and E.M.L.). April 20th, a pair on Gosforth Park lake, Newcastle (C.J.G.).

Pochard.—The winter flocks on Gosforth Park lake were largest during the period February 12th to March 3rd. On February 19th there were about 100 and on three other dates 60 or more (A.M.).

Tufted Duck.—On March 3rd, during wintry weather, three were seen on Leazes Park lake, Newcastle (W.A.W.). In November a flock of six appeared on the lake at Saltwell Park, Gateshead (G.D.S.). Two broods were hatched on Newton Hall lake, Stocksfield, N. (H.T.).

Scaup.—Inland records : January 1st and 2nd, one female seen on the South Park boating lake at Darlington (M.G.R.). January 7th, a pair seen on Jarrow slake, D. (H.T.). January 18th, a drake shot at Chollerton, N. (Dr. R. Lyle). February 9th, nine on Jarrow slake (H.T.). March 26th, a female seen on the lake near Howick Hall, N. (M.G.R.).

Eider Duck.—The watcher on the Farnes stated that 330 broods were hatched out on the Islands this summer.

Common Scoter.—July 16th, a flock of about 60 at sea off Alnmouth, N. (F.J.N.). No doubt non-breeding birds, as mature birds would be in their northern nesting quarters at this date.

Goosander.—February 19th, six birds visited Newton Hall lake, N., and this number increased until there were 14 on March 30th. The last was seen on April 10th (H.T.).

Smew.—A female or immature bird remained on Hallington reservoir, N., from January 2nd to 8th, and another from November 19th to December 17th (H.T.).

Shag.—The watcher on the Farnes reports that at least six pairs bred on the Islands this summer.

Fulmar Petrel.—January 22nd, already about 30 birds at their Cullernose, N., breeding cliffs (F.J.N.). The watcher on the Inner Farne states that four pairs bred there this year.

Manx Shearwater.—July 2nd, three seen off the Farnes (H.T.). July 4th, several off Alnmouth, N. (J.R.E.). November 20th, three off the Stag rocks, Bamburgh, N. (H.T.).

Great Crested Grebe.—None bred this year at either of the usual Northumbrian haunts.

Great Northern Diver.—The bird on Whittle reservoirs, N., recorded in our last year's Report, remained throughout the winter of 1938-39 and was last seen on May 20th (H.T.). On January 7th an immature bird was found dead at Catcleugh reservoir, N. It was very emaciated and weighed less than 4 lbs. (R.C.).

Oystercatcher.—Throughout the year a flock haunted the rocks north of Boulmer, N. Its number varied from 50 to 120, the largest being seen on August 19th. The flock never broke up entirely and always (*e.g.* on July 1st) many birds showed the white band on the neck which denotes the ' winter ' plumage (F.J.N.). A few pairs now breed regularly on the gravel beds in the North Tyne and Breamish, N.

Ringed Plover.—Several pairs are now breeding on the Breamish, N. During August several odd birds appeared on the Darlington Sewage Farm, D. (M.G.R.).

Golden Plover.—July 29th, a flock of from 300 to 400 near Twice Brewed, N. (E.M.L.), probably young of the year now flocking.

Ruff.—March 18th and 19th, two at Primrose, Jarrow, D., and on March 26th a Reeve at South Charlton, N. (H.T.). On Darlington Sewage Farm, August 22nd, two Ruffs and a Reeve, and on 24th two Ruffs and two Reeves (M.G.R.).

Knot.—Birds in various degrees of ' red ' plumage were seen on several occasions at Alnmouth, N., during August (F.J.N.).

Wood Sandpiper.—August 22nd and 24th, one seen at Darlington Sewage Farm (M.G.R.).

Green Sandpiper.—March 22nd, one at Whittle reservoirs, N. April 15th and 29th, one at Primrose, Jarrow. July 30th, one at Hallington (H.T.). August 11th, one at Alnmouth (F.J.N.). August 22nd, a number at Darlington Sewage Farm (M.G.R.). October 3rd, three on the shore of Catcleugh reservoir, N. (R.C.).

Spotted Redshank.—In April one at Goswick, N. (T.E.H.). On August 22nd and 24th, one on Darlington Sewage Farm (M.G.R.).

Greenshank.—A single bird again ' wintered ' at Alnmouth, N. It was seen week by week until March 26th, 1939. A single bird re-appeared on July 16th, two were seen on July 23rd, and thereafter a single bird was seen constantly till the end of August. (F.J.N.) August 12th, one at Primrose (H.T.).

Bar-tailed Godwit.—On August 17th and 19th single birds reappeared on the coast, and one in full ' red ' plumage was seen at Boulmer, N., on August 30th (F.J.N.).

Black-tailed Godwit.—From April 22nd to 25th, a flock of 28 birds, all in complete red summer plumage, remained on the shore of Grindon Lough, a unique sight in Northumberland ! They were observed to fly off in a northerly direction on the 25th and were not seen again (H.T., G.W.T., and E.M.L.). January 8th, one on Whitburn beach, D., and December 11th, one on Boldon Flats, D. (C.P.).

Curlew.—On rocks north of Boulmer, N., there is always a flock of up to 200 birds. Like the Oystercatchers, the flock

never completely breaks up in the summer months, but comes down to about 50 (F.J.N.).

WHIMBREL.—First noted at Alnmouth, N., on May 7th. Seen or heard again July 15th and on various dates in August, sometimes several birds flying over together (F.J.N.).

SNIPE.—An unusually large flock wintered (1938-39) in the reeds on the shore of one of the Whittle reservoirs, N. (H.T.).

GLAUCOUS GULL.—During the month of April a single bird, probably a nearly mature female, remained on Jarrow slake, D. (H.T. and G.W.T.).

ICELAND GULL.—On May 11th one seen at Primrose, Jarrow, D. ' It was very slightly smaller than some immature Herring Gulls which were present. Its whole plumage was white, slightly freckled with brown on the back and wings ; the bill being of a rather dirty horn colour with a dark tip. The wings extended about 1½ inches beyond the tail. It was probably in its fourth or fifth year ' (H.T.). December 25th, one seen near Cleadon, D., feeding in a ploughed field, probably in third winter plumage (H.M.S.B.).

ROSEATE TERN.—More numerous than usual on the Farne Islands this year.

ARCTIC SKUA.—July 15th, one seen off Whitley Bay, N an early date (H.T.).

CORNCRAKE.—In view of the fact that this species has been very scarce indeed in our area for some years past and that the British Trust for Ornithology has recently organised a ' survey ' of its occurrence in the British Isles, the following detailed notes for 1939 may be of interest.

Northumberland.—Warkworth, South Side Farm, none heard this year, though in 1938 a pair nested and several were heard in that neighbourhood (E.M.). Upper Redesdale, Woolaw, one heard, ' the only record for the valley this year ' (R.C.). Elsdon, East Todholes Farm, one heard for the first time for seven years (in August, 1932, two broods were destroyed by reapers on this farm (Press)). Morpeth, one heard, May 28th. North Tyne, Tarset, one heard, July 5th (G.W.T.). Humshaugh, one on June 14th. Tyne Valley, Hexham, one heard from May 7th to June 4th, and another for a week or two at the same time (E.M.L.). Whitley Chapel, one heard on July 23rd, ' known in the same field for the past five years ' (P. Oliver). Stocksfield, three heard on June 3rd ; a bird of the year seen in a garden on September 20th (G.W.T.). Wylam, one heard, May 6th (C.H.). Kenton, one heard, May 30th (C.J.G.). Bardon Mill, one heard, June 14th. Haydon Bridge, several in neighbourhood, June 10th.

County Durham.—Rowlands Gill, one heard, May 12th (C.H.). East Weardale, one nest known. West Weardale,

near Stanhope, one heard. Darlington, five separate birds known in neighbourhood. Middleton-in-Teesdale, two nests known. 'The Corncrake has been heard at Middleton-in-Teesdale and other places in Upper Teesdale after an absence of several years' (Local Press).

Cumberland.—Alston, on July 6th, and for two or three days afterwards, one was heard for the first time for six or seven years (E.S.B.).

Quail.—A bird was heard calling near Ryton, D., on July 2nd, but was not heard again throughout the summer (W.E.).

Key to the initials occurring in the above Report: Miss E. S. Bolam, Dr. H. M. S. Blair, J. M. Craster, R. Craigs, S. E. Cook, J. R. English, W. Eltringham, C. J. Gent, J. Greenwell, Miss R. M. Grey, R. Grey, T. R. Goddard, C. Hutchinson, C. A. Hodgson, P. L. Hogg, Mrs. T. E. Hodgkin, Miss E. M. Lobley, A. MacRae, E. Miller, F. J. Nattrass, Mrs. C. Potter, W. R. Philipson, M. G. Robinson, W. K. Richmond, G. D. Sinclair, H. Tully, G. W. Temperley, W. A. Wright.

BEHAVIOUR OF STARLINGS IN THE SEARCHLIGHT

REX PROCTER

On the night of March 20th, 1941, I had occasion in the course of my duties to approach a searchlight battery at about 1 a.m. The searchlight was at this time showing a vertical fixed beam. On approaching nearer I was interested to note what appeared to me to be a series of rising and falling silver stars. I made a closer examination and found that this was a very large flock of starlings which were playing in the beam of the searchlight. I watched them for about twenty minutes, and during this period there appeared to me to be two types of behaviour.

1. The greater number of the flock formed a compact body which rose within the beam of the searchlight to a height of 30 to 40 ft. and then fell again almost on to the glass front, repeating this operation over and over again and apparently in a state of extreme excitement. This party remained within the limits of the beam the whole of the time and in a very compact mass with only a few stragglers. They appeared as if hypnotised and rose and fell within the beam with great rapidity.

2. The second body fluttered about just outside the beam, also rising and falling, but not nearly so rapidly, nor in such an excited manner as the main body within the beam. Individuals from this outer body would continually dart into the beam as though anxious to join the main body, but would almost immediately dart out again and rejoin the outer body of stragglers. This outer body was not compact, nor was the

flight of its members so synchronised as the flight of the members of the inner body.

Shortly after this I had to leave the searchlight, but about 2½ hours later I was in a position on the top of a hill about five miles away and from this position looking down on to the searchlight I was able still to see the bright shining mass of the main body of starlings still rising and falling within the beam of the searchlight.

On March 22nd I obtained some further information regarding the behaviour of these birds by questioning an N.C.O. stationed at the searchlight. He was a very intelligent man, but, of course, his remarks were purely the result of odd casual observations.

1. The birds were first noticed about five weeks ago. This does not mean that this behaviour did not occur more than five weeks ago, but only that it first became obvious about this period.

2. Since this time these flights in the searchlight beam have occurred nightly.

3. When they first were noticed about five weeks ago the number of birds taking part was only very few, but the numbers have increased regularly over the whole of this period and I was informed that last night was the largest flock that they have ever seen.

4. The general method of flight seems to be more rapid up the beam than down the beam.

5. Considerable numbers of birds are overcome either by the great heat generated by the searchlight or else blinded by the very powerful light. These overcome birds fall to the ground where they lie until they gradually recover, when they first walk around for some time and then rejoin the rest of the flock in their beam flights.

6. On the same searchlight site are two other searchlights of very much less power. I was informed that the searchlight to which these remarks apply is the most powerful one in the district. My informant told me that these flights occur only in the fixed beam of the powerful searchlight and that he has not noticed them in the beams of the two searchlights of lesser power. At the same time he stated that the two lesser searchlights are never in operation without the big one, neither do they remain stationery, which may account for this. The big searchlight on the other hand is often in use without the lesser ones.

On April 22nd I again visited this site. On this occasion no starlings were evident.

Since this time I have, in the course of my duties, again visited the searchlight site on several occasion, but at no time have I seen any starlings.

BRITAIN NEEDS TREES
HOW NATURAL HISTORY SOCIETIES CAN HELP

R. ST. BARBE BAKER

BRITAIN provides hospitality to a great number of trees, many of which are not found in any other country in the northern Temperate Regions of the world. Here we rarely suffer from the tropical heat so often experienced in Central Europe during summer, and the cold of winter is modified by the Gulf Stream and the fact that we are living on an island where the sea is never too distant for it to temper the climate.

Landowners of the past have taken full advantage of this and have introduced many trees from California, British Columbia, and, indeed, many parts of the Australian continent, New Zealand, and other almost sub-tropical climes. We in Britain love our trees, but we have hardly thought of their value as a national asset to be planted wisely and harvested to meet the Nation's needs. It is only when in such times as these through which we are now passing that we become aware of the importance of timber production.

During the last war a very large proportion of our woodlands were sacrificed to meet war needs. The present situation is even more acute and great inroads are being made into our few remaining woodlands to replace timber which ordinarily comes from the Baltic and the Scandinavian countries. It is of urgent importance to make good the fierce cutting which has taken place since the outbreak of war. We must not wait until peace comes before replacing the trees that have been felled.

In Continental countries, where conditions are less favourable for forest growth, they are all the more careful to work to a plan and run woodlands on a sustained yield basis. Silvicultural systems have been in vogue in some cases for centuries and millions of men and women are employed either directly or indirectly in forestry work. A tree sense has been developed in response to community needs and the people are more provident than we have been in the past.

The problem that faces us is not merely that of planting ; that must be done, of course, on new land, but in established woodlands trees are better produced by natural methods. The practise of natural regeneration is one of the arts of the trained forester, and planting should be necessary only when silvicultural operations fail.

In scientific forestry so much depends upon keeping the balance of nature, prevention is better than cure, and trees, like human beings, have their enemies and also their friends.

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With all their scientific forestry on the Continent mistakes have been made, with the result that there have been disastrous outbreaks of pests which have ravaged their forests. Good silviculture is essential, of course, in the first place, but it is only partially effective against injurious insects, birds, and animals, and these must be dealt with by biological control, that is to say, by the active encouragement of beneficial agents and the suppression of their enemies. The encouragement of useful insects or the introduction of parasites on harmful ones is difficult and sometimes dangerous, because the balance of nature is so fine in adjustment that it can easily be upset.

The encouragement of predaceous birds for the control of harmful insects is easier than that of useful insects and is something that every naturalist can help with, and so I will deal with this more fully. It should be remembered that there are two factors only which govern the decrease of any organism —lack of food and the presence of enemies. Insects and animals can be controlled biologically by means of insects, parasitic fungi and insects. Insects by means of predaceous birds and animals. Animals, by means of predaceous birds and animals. All parasites are characterised by their almost complete interdependence on one species or genus of insect. They can control their numbers but not annihilate them ; they are the police rather than the military force in nature. Moreover, from their mode of life it is readily understood that parasites cannot by themselves check any sudden increase of injurious insects, for their generation is always one stage, usually one year, behind that of their hosts. Parasitic insects must be regarded as an ever present and necessary form of natural control, which it is only possible to encourage by the discouragement of its enemies. In the forest these are Fly-catchers, Martins, and Swifts, and no doubt some good results from measures which prevent these summer migrants from nesting. For various reasons, which I have not space to cite fully, I regard the following birds as useful to trees, and they should be encouraged by the proper use of nesting boxes in woods and on the edges of young plantations.

At all months of the year, but specially in summer time, the Starling is useful, while the Redstart and the Robin are of considerable importance and can be readily encouraged to nest in artificial sites. The Blackcap, Grasshopper Warbler, Garden Warbler, and Nightingales are helpful species. A true forest bird is the Coal Tit, which, together with the Great Tit, is more useful than other members of the genus, though the Willow Tit and Marsh Tit are distinctly beneficial. The Blue Tit is restricted to broad-leaved trees and the Goldcrest inhabits all kinds of coniferous woods.

Nesting boxes must be provided by the middle of March to induce most Tits to nest, and their enemy, the Sparrowhawk, should be destroyed. The Woodpeckers, though often accused of damaging trees, rarely, if ever, attack healthy timber. The Cuckoo is of primary importance to forestry because, not forced to remain in particular areas for nesting purposes, it is free to move wherever food is most abundant. The Nightjar, useful on newly-reclaimed tracts, is frequently shot in mistake for a Hawk. Owls are good foresters, and of these the most helpful is the Tawny Owl. The Barn Owl and the Little Owl are of less importance and sometimes destroy other useful birds.

With all our beautiful trees it is deplorable to have to state that we are the worst afforested country in Europe. For instance, comparing Britain even with other industrial countries, we find that France is 28 per cent. forest, Germany 26, Belgium 18, while we have about 5 per cent. of our total area which can be regarded as such. Of the total area of Norway 50 per cent. is covered with forests and 75 per cent. of Sweden. It is high time that we woke up as a nation to the gravity of the situation.

Naturalists can do perhaps more than most to create a tree sense. There are Natural History Societies throughout the length and breadth of the land and schools have their own clubs and societies. The Society of the Men of the Trees, founded 18 years ago, is working to create such a tree sense and would welcome the co-operation of any Natural History Society or club for affiliation, and would in turn keep them posted through the official journal, *Trees*, and publications on all matters relative to the subject.

Just now this society has launched a nation-wide appeal for a million shillings to help replace the trees that have been sacrificed during the War. Many individuals may not have land on which to plant, but their trees can be planted for them by proxy through this fund, and they will be planted where most urgently needed.

The whole country will be covered by gifts of trees proportioned out in each district or county. Tree-planting is a looking-forward kind of action ; by the planting of trees we are making our country more beautiful to hand on to.

Trees are a trust ; we must plant and protect them.

> ' Who does his duty is a question
> Too complex to be solved by me,
> But he, I venture the suggestion,
> Does part of his who plants a tree ! '

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REVIEWS AND BOOK NOTICES

The Way to an Island, by **R. M. Lockley.** Pp. xii.+208, with 19 photographs and a map. Dent, 7/6. Many ornithologists, and other naturalists too, will have heard of Mr. Lockley's work on the island of Skokholm off the Pembroke coast, and may have read his book ' I Know an Island.' In this new volume he becomes autobiographical and begins with a vivid and entertaining account of his boyhood in Wales. Like most boys he preferred to be out of doors and was happiest when roaming the countryside, bird's nesting, exploring and ' camping-out.' He has, in effect, kept up this way of life right through to manhood, and now possesses Skokholm on a long lease. As many North Country naturalists know, Skokholm is a wonderful place for birds, and many will envy Mr. Lockley with his now renovated island house. At the precise psychological moment a schooner laden with coal ran ashore. Mr. Lockley bought the wreck from the underwriters for £5. He and his friends extracted over 50 tons of coal from the schooner's hold and they amassed an immense pile of useful timber, to say nothing of countless odds and ends, including lamps, cots, sails and compasses. Sheep are doing well on the island, especially since the virtual extinction of the rabbits. It is interesting to read of Mr. Lockley's entire approval of the Cyanogas treatment for rabbit control recommended to him by the Universities Federation for Animal Welfare. This charming book is such a magnificent advertisement for Skokholm that we predict an embarrassing influx of visitors when the war is over.

Factors Affecting the General Status of Wild Geese and Wild Duck, pp. x.+124. Cambridge University Press, 8/6. The serious decrease in the numbers of wild fowl of all kinds which has been only too noticeable in the last hundred years has stimulated an International Inquiry. Volume II, which dealt with Scottish Wild Fowl, was noticed in our last volume. The volume now under review is Volume I, and should be read and studied by all naturalists. Nearly twenty well-known biologists and naturalists contribute eight papers to this work. The main factors which are considered to be the most important are dealt with exhaustively and conclusively. Very briefly summarising, one can say that the major influences at work appear to be improved weapons of destruction, the greater mobility acquired by man with the invention of the internal combustion engine, the immense slaughtering of wild fowl without regard to breeding requirements, and lastly, the curiously sudden falling off over a large area of an important food of certain wild fowl. This last matter is dealt with in a masterly way by Dr. R. W. Butcher, formerly of Leeds, who contributes a chapter entitled ' The Distribution of *Zostera* (Eel Grass, Wigeon Grass) and other seashore plants in Relation to the Migrations of Wild Fowl.'

The Land of the Blue Poppy, by **F. Kingdon Ward.** Pp. 192, Penguin Books, 6d. Mr. Ward was already an experienced traveller when he set out in 1911 to explore Western China and Tibet in search of plants. This book was the record of his adventures and has long been out of print. Mr. Ward's fascinating accounts of his extensive botanical excursions are now well known in such works as ' The Romance of Plant Hunting,' 'A Plant Hunter in Tibet,' etc., and it is therefore easy to predict a great welcome for this reprint of the first of the botanical exploration series. The book is very well written, and crammed with adventure, fine descriptions of peoples, scenery, and of the wonderful flora of the valleys belonging to the great plateau. When will it be possible for the ordinary civilian naturalist to go over the same ground again?

THE NOCTULE

(*Continued from page* 161)

The noctule does not use the same retreat throughout the summer, or perhaps it would be more accurate to say that all the members of a colony do not remain faithful to the one den throughout the summer. The numbers in any colony vary very considerably from evening to evening, and while it is possible that all the inmates do not emerge every evening, I do not believe this to be the case. Mr. Oldham, writing in *The Zoologist* in 1901, gives the numbers of bats he saw emerging from two different colonies on twenty-three evenings, several of them consecutive. Only in one instance do the numbers given agree, and in many cases the variation is extraordinary. For example, twenty emerged on May 4th, fifteen on May 6th, five on August 23rd, twenty-seven on August 27th, eighteen on September 9th, six on September 17th, and seventeen on September 29th. Mr. Oldham does not appear to have examined the holes after the departure of the bats. But it is not reasonable to account for the discrepancy between the numbers on any two days by presuming that the residue remain in the hole and contentedly go hungry. I have examined many holes after the departure of the bats in the evening, and have yet to find one containing an inmate. In my opinion no noctule misses its evening meal of its own free will. I believe that during the summer months the noctule covers long distances (I admit I have no real proof to support this belief) though they generally return to the same hibernaculum each winter.

At one time it was thought that the flight period of the noctule was restricted to about an hour and a half in the evening, and that, that period being completed, it did not leave its den again until the following evening. Mr. Oldham, judging from the behaviour of a captive noctule, was of this opinion. One or two other naturalists disagreed and brought forward instances in support of their belief that the animal also flew just before sunrise. As a result, Mr. Oldham undertook an all-night watch outside a noctule den in Cheshire on May 20th, 1900. He gave an account of this vigil in a most interesting essay in *The Zoologist* (1901, p. 153). He found that no bat entered or left the hole after 9-36 p.m., but that there was intermittent squeaking until 10 o'clock and

> 'a slight squeaking in the den at long intervals until 2-40 (eighty-five minutes before sunrise) when the noise increased, and more than one bat emerged—in the gloom I could not tell the exact number—and all was still until 3-20 (forty-five minutes before sunrise) when three returned. These dashed round among the branches, alighting on the

trunk at the mouth of the hole once or twice, and then dashing away again before entering the den, as noctules generally do on returning from the vespertinal flight. There was no squeaking after the bats entered the den, and I heard none until 4-2, when I left the tree.'

That proved the existence of matutinal flight. And it is now generally accepted that the noctule flies for about ninety minutes in the evening and for another sixty minutes or so before sunrise, but that it does not fly through the night or even during the night, and that its name is, therefore, a complete misnomer. Now I have myself watched matutinal flight on innumerable occasions—it is, as a matter of fact, a daily occurrence—but I do not accept the general belief that the noctule does not fly during the night, that is, between the hours of 10 p.m. and 2 a.m. ; I believe that it does do so, and I have one definite record in support of my belief.

It must be remembered that while it is easy enough to observe the bats when leaving their retreat in the evening, it is very difficult to do so when they are returning. They do not at once (so at least did Mr. Oldham interpret their actions) enter the hole on their return, but frequently settle at the entrance and then dash away again ; and I have seen this performance *apparently* repeated several times. But I have no definite reason for believing that it is the same bat that settles at the entrance each time. It may well be that a different bat comes and a different bat goes. Perhaps some may enter at once (each arrival is not necessarily greeted with squeakings) while others may, perhaps, settle and then leave, deciding that that hole is not the one they want or is in some way unsatisfactory. The light is bad. One can see nothing at all (as Mr. Oldham found) when the bat is flying against the background of branches and leaves. Even when the night is fully moonlit one can see the bat only for the moment in which it leaves the shelter of the trees and is silhouetted, no more, against the sky. Beyond this, the only intimation of their presence is the slight sound of their wings. One can count their goings, perhaps their comings and goings. One can guess. One cannot know for certain merely by sitting in a tree and listening for the sound of wings.

I watched a noctule den, set in a beech, for four consecutive nights in June. It was a male den. On each occasion I counted the inmates before the evening flight and again in the morning. On two nights I also counted them at midnight : on the other two I had a net fixed over the entrance from 10-30 p.m. until 2 a.m.

On the Tuesday there were twelve males in residence at 7-30 p.m. At 10-35 p.m., by which time all noise of flight

had ceased, I placed a net over the entrance. I caught nothing. At 2 a.m. I moved the net, and at 2-16 the first bat emerged for the matutinal flight. At 6 a.m. I counted the population of the hole again. There were nine males only. I saw no sign of nocturnal flight on this night, and certainly there was none to or from this den. But have I any right to say that the three missing bats were not flying during the night?

On the Wednesday there were nine in residence at 7-30 p.m. At midnight there were nine snugly tucked up. At 2-30 the first emerged for the morning hunt. At 6 a.m. the same nine (so far as I could judge) were resting after breakfast. I saw no signs, nor heard any sounds, of nocturnal activity on this night.

On the Thursday the nine were in residence at 7-30. At 10-40 p.m. I counted twelve in the hole and affixed my net. At 12-35, while I was eating a sandwich, there was a considerable commotion, and my net contained a fine male *trying to get in*. I released him and placed him in the hole, and refixed the net. But I had no further success. It is worthy of note that I did not so much as hear the wings of this midnight visitor. But for the net he would have entered without my being aware of his presence. And even had he returned after the matutinal flight, I should not have known that the hole had had an additional guest during the night. At 2 a.m. I removed the net, but the first bat did not leave until 2-57 a.m. after a very lengthy period of squeaking. At 6 a.m. there were ten males in residence.

On the Friday at 7-30 p.m. there were fourteen bats in residence. In other words, four bats had arrived during the day. I counted again at midnight and there were only ten. The morning flight commenced at 2-16. At 6 a.m. the number in the den was nine. Again on this occasion I saw no signs of nocturnal flight: but I cannot say that no such flight occurred.

And so, while I cannot say that the noctule flies every night, I do know that it does fly at night, and I am convinced in my own mind that such flights are by no means uncommon.

During the diurnal sleep the noctule is cold and sluggish, but grips its support very tenaciously. The warmth of the hand, however, soon wakes it up and it then becomes very lively. Mixed colonies do not indulge in diurnal sleep to any great extent (particularly is this so in September) and are therefore the harder to handle.

Diurnal flight (of which I have given an example above) is by no means uncommon. Unfortunately, newspaper records rarely, if ever, give the species of bat and so are of very little value. In any case, winter flight during the day,

no matter what the species, is almost always the result of disturbance, and as such may be discounted. Certainly it may be disregarded in the case of the noctule. Gilbert White, who was a very careful observer, gave the noctule a most limited period of activity. He never saw it abroad until the end of April nor later than July. This very short season at Selborne must have been due to causes other than hibernation ; my own view being that the bat had but recently arrived in England and was not fully acclimatised. Later observers have progressively lengthened the period of activity, until it would seem to include every month of the year save only the latter part of December and the month of January. There are, indeed, records of flight by noctules during each of the winter months—with the exception of January—but none of them can be regarded as proof of an extended period of activity. I have myself records both for November and February, but I am quite positive from my own observations that the noctule is a close hibernator with a definite period of activity, not so limited certainly as that assigned to it by Gilbert White, but nothing like so generous as that given it by later generations of naturalist. Diurnal flight during the winter months is, I am convinced, always the result of interference by some outside agency.

Diurnal flight during the summer is another matter. There are a considerable number of records of this and I have myself seen the noctule flying in broad daylight during midsummer on several occasions. Once in London Road, Leicester —a very busy thoroughfare—at 2-30 p.m. on a hot July day, I saw one flying low along the train lines. But this animal had almost certainly been disturbed. In Hampshire daylight flight is not altogether uncommon, although it is exceptional. I have seen noctules in flight during the daylight hours at Itchen Abbas (in June, four flying north-west at 2-35 p.m.), at Alresford (in June, two flying north at 10-15 a.m.) : at Otterbourne twice in July, one flying east at 3-10 p.m. and again two flying east at 11-20 a.m.). At Lyndhurst (in August, eight flying south-west at 1-37 p.m.) and at Burley (in August, four flying south-west at 2-5 p.m.) : and in Wiltshire, at Wilcot (in August, one flying south at 2-10 p.m.), at Oare (in August, one flying south at 11-15 a.m.), at Woodborough (in September, seven flying east and very near the ground at 10-10 a.m.), and at Enford (in September, one flying north at 4-15 p.m.). In each case, except the one at Woodborough, the flight was conducted at a considerable elevation, and in every case at a considerable speed. It was purposeful and direct, with no dallying for hunting, and in each case, too, it was quite silent. The immediate impression given was that a journey was being undertaken.

Barrett-Hamilton in his *History of British Mammals* mentions another case. He records that the Rev. A. Mathews told Mr. Montagu Brown ' that one broiling hot day in July . . . at mid-day, when the air was perfectly bright and clear, he observed swallows circling at an immense altitude, and above them, at a much greater elevation, four large bats, which he supposed to be of this species.' I confess to having some doubts about this record. If the estimate of the height at which they were flying is not grossly exaggerated—and there is no reason to suppose that it is—the bats must have appeared as mere specks to the naked eye, and even with the aid of glasses, it would still have been quite impossible to distinguish the species with any certainty. Though the noctule is the largest bat likely to be met with in England, the possibility that the ' large bats ' seen by the reverend gentleman belonged to another species cannot be discounted. *Myotis myotis*, a considerably larger animal and one common enough on the other side of the Channel, has been recorded at least once in England, and there is nothing inherently impossible in its turning up again. Indeed, it could well do so regularly and escape attention. But the record is interesting, particularly to myself, for a somewhat similar instance has come within my own experience. This was on June 4th, 1930, at 2-20 p.m. I was then on the crest of The Dyke, near Brighton. It was a fine, hot day, the sky cloudless and the atmosphere absolutely clear. There was on the hill a gentle south-westerly breeze, though in the valley it had been insufferably still and hot. The bats were flying at a great height. They appeared to the naked eye as two or three dots. But through the glasses it was apparent that there were a dozen or more. They were travelling due north (rather across the ground wind, therefore) and they were going very fast indeed. There was no sign of any formation about the flight. That they were large bats was evident, but I could distinguish neither the colour nor the type of flight with any accuracy, and I would not attempt to dogmatise about the species. Now, south of The Dyke lie Brighton and Hove, and beyond those towns the Channel. These bats—it is most improbable that they came from either Brighton or Hove—must therefore have come from France. The noctule—if they were noctules—is a very powerful flier, capable of covering great distances, and I do not think that a crossing of the channel, even a crossing at Brighton, would impose upon it any undue strain. I believe that these daylight flights—except for those instances in which untoward disturbance seems obvious, as for example that given for Leicester—are definite journeys from one region to another (regional movements are, of course, migratory movements in

miniature) and that those flights which are undertaken at a great height are true migratory movements. Year by year, on a given area, I have found that the summer population is very greatly in excess of the winter population. I have found, indeed, so great a disparity that mere regional movement cannot, in my opinion, account for it. For were regional movement the explanation, the noctule would, I think, be totally absent for several days from certain of its habitual haunts. I have not as yet heard of any such occurrence—though I admit that the number of naturalists interested in bats is so limited that it might be possible for such an exodus to pass unnoticed—and until I have proof of such an event I shall continue to believe that each summer we receive a certain number of Continental noctules as visitors, and that some remain as residents. This would account for the distinct increase in the summer population and for the noticeable fluctuations in its numbers. It has been suggested that the increased numbers that have been noticed in August are caused by the presence of the newly-fledged young, and it is true that by the month of August—certainly by the end of that month—the young bat is very well able to look after itself. Jeffrey, however, writing to Newman in 1874, pointed out the increased numbers to be seen in August around Chichester, and said that he had always imagined a southward migration during the month, though he admitted he had no definite information on the point. Personally, I find this observation of the greatest interest—though little or no attention has been paid to it—for I think that Jeffrey was wrong only in the direction he gave to the migration. For I do not believe—and certainly my own observations lend no support to the theory—that the numbers of newly-fledged young can possibly account for the greatly increased numbers that are undoubtedly to be seen on the wing in the south of England during the month of August. The winter population, as I shall endeavour to show, remains remarkably steady ; the same bats, with few exceptions and occasional additions, inhabiting the same hibernaculum from birth to death.

There has for many years been some question as to the supposed preponderance of females in this species. Whitaker did not believe that there was any such preponderance. But the published observations of various naturalists are essentially contradictory. Much more evidence on this point is needed. My own observations show clearly that females outnumber males. The largest colony I have found contained forty-five females, and I have found several of thirty and more. The largest colony of males of which I have personal record contained thirty-one individuals, but I have found eight to twelve to be the usual number in a male colony.

It is true that during the months of June and July it is usual to find at least as many males and females, but it must be remembered that the majority of females are then either pregnant or nursing, and are, therefore, less active.

The normal breeding season of the noctule is the autumn. During the month of September—though occasionally the move may be delayed until October—both sexes gather together in the retreat chosen for hibernation. Sometimes the sexes occupy separate retreats, and in these cases the males visit the females as guests, leaving before the winter sleep commences. It is during these few weeks that coition takes place and the eighteen-month-old female is impregnated. It is easy enough to interpret idle actions as courtship actions, idle or accidental poses as deliberate postures or displays. It is easy enough to detect in one's mind differences of timbre in the squeaks during the breeding season. There was a time—about sixteen or seventeen years ago—when I thought I could detect all these things, when I believed that there was courtship display. But the wish was father to the thought. These things are no more than the offspring of enthusiastic imagination. Perhaps, with increasing years, my perceptions have been blunted. I do not think so. Certainly my enthusiasm is no less. And I am now convinced that, as we understand the terms in the ornithological sense, there is no courtship or display. The males sidle—it is a crab-like movement—up to the females. The females sometimes, but by no means always, show their pleasure by a fluttering of the wings. Occasionally they utter little squeaks ; more rarely the males may become vocal. Beyond this I have seen no signs of courtship. And it is worthy of note that should the female remain quiescent, should there be no fluttering of wings, the male is not in the least deterred. During the breeding season there is some fighting between the males, but little or no damage is done ; and, since there is no question of securing a mate for more than a few moments, this fighting seems quite without point, and is conducted in that spirit. In those cases that I have observed, the females have outnumbered the males. Each breeding female was, however, visited by more than one male. On one occasion I saw one female visited by five males within the space of twenty minutes. On another a male, a very fine specimen with—a most helpful distinguishing feature—a completely black coat, visited in turn, and with but brief intervals, each of fourteen breeding females. Coition takes place during the day—intermittently all day—and, possibly, during the night also, although I have personally never observed sexual activity at night. Copulation in the spring is very rare. I have observed it only on four occasions, and on each occasion

the female was in her first year and should not have mated until the following autumn. Homosexuality, however, is common in the spring, and, since the males are in full possession of their powers, I suspect throughout the summer. Should a fully mature female miss pairing in the autumn she will not, in my experience, mate the following spring. I have, indeed, found virgin females in their third year. The male noctule does not appear to attain his full functional powers until his second autumn. The female does not appear to bear children after her fourth or fifth autumn. Ovulation and the fertilisation of the ova do not take place until sometime after hibernation is over. Apparently ample feeding is necessary before full reproductive activity is restored. The amount of food obtained naturally varies with the individual, and this would account for the wide discrepancy in dates for the birth of the young. My earliest record is for the 8th June and my latest for the 4th August (in this case the mother was in her first year and had paired during the previous spring). The most usual date is in the neighbourhood of midsummer day and, though this cannot be stated with any certainty, the period of gestation seems to be approximately forty-nine days.

Almost all our knowledge of parturition and lactation in the noctule has been derived from captive bats. George Daniell published a very interesting account of the birth of a baby to one of his captive bats in the *Proceedings of the Zoological Society* as long ago as 1834, and Whitaker an even more detailed account in *The Naturalist* in 1905. In both cases the actual birth was observed. I have not myself been fortunate enough to witness the actual process of birth. But I have observed in the wild state several mothers and their young, and one or two from the day of birth to the growth of fur. Such observations are necessarily not so complete as those conducted on captive bats, and, indeed, appear meagre in comparison, but as a check on captive observations they may not be without worth.

I have always found that the baby clings to its mother's fur just below the shoulder, and underneath the wing, with claws and wings. In my opinion also, it is usually suckled from the right nipple, for I have found that the right nipple in nursing mothers is considerably enlarged. I have, however, never observed the actual process of suckling, for the mother shields her offspring from observation most carefully for some time after birth by wrapping a wing—almost invariably the right wing—around it. When the mothers fly, they carry their young with them. The young are carried under the body (never on the back) and their presence does not seem to inconvenience the parents in the slightest, at least for the first week and occasionally for as long as ten days. But

then—growing weight no doubt interfering with the success of the mother's hunting—the baby is left behind in the den, where it hangs quite contentedly. Growth is rapid. The eyes open about the eighth day, and the young bat is quite decently clothed in about a fortnight. I feel sure that in the case of Whitaker's baby noctule, which was still blind, naked and helpless on the eleventh day, captivity had retarded development. By the month of August, and certainly by the middle of that month (except in very exceptional cases) the young bat is not only on the wing but is very well able to look after himself. He has therefore a month or a little longer in which to prepare himself for hibernation by good and plentiful feeding.

Observation of hibernating bats is, of course, very much easier than that of active bats. It is not so exciting—I suppose it could be called dull, routine work—and it is perhaps for that reason that no one appears to have undertaken it. For all that, observation systematically conducted on regular hibernacula is not without interest, and produces its own peculiar problems. At least so I think, after observing hibernating bats regularly over a period of four years.

First Year.—On October 20th I found a small colony of male noctules hibernating in a disused shed. On the following day a female colony was found in a deserted barn about twenty-five yards away. There was plenty of room in both buildings for both sexes. Obviously, therefore, a complete segregation of the sexes was undertaken for some reason. This is by no means always the case. In this same winter, about two miles from these hibernacula, I found males and females hibernating under the same roof, though in this case also there was segregation, in that all the males were together and all the females together with a gap of about twelve inches between the first male and the last female. Though it would have been easier from the observation point of view to watch this joint hibernaculum, for reasons of time and ease of access the separate hibernacula were chosen, and regular observation was kept on both colonies throughout this and the three succeeding winters.

When first discovered, the male colony consisted of ten individuals, hanging in a row, bunched very close together but not overlapping at all, and all hanging head downwards. When I first entered the shed the bats were immediately aware of my presence without actually waking from their sleep. They showed their consciousness by a shivering of the wings and a very slight shifting of the feet. As the winter advanced they sank deeper into coma, and were quite oblivious to my presence. The males were all fully mature, and one—the third from the right as I faced them—was a beautiful

specimen, with coal-black fur fading to a dirty dark grey below. During this winter there were several mild and sunny days on which the temperature exceeded 40° Fahrenheit, but these mild days had no effect whatsoever on any of the inmates. There was, indeed, no sign of any movement at all until the 15th March, when three of the bats had their heads showing between their wings, and six were aware of my presence as soon as I entered the shed. On March 16th six had their heads showing. On the 18th these six left the shed more or less together at 6-15, and in doing so knocked two of the remaining four from their perch. They were again in the shed on the 19th and on the 20th, but did not return thereafter. The remaining four—the four that had been in the middle of the line—were examined on the 21st and found to be dead. The two on the ground (those two knocked from the perch by the movement of the bats when leaving) had already crumbled ; the two still hanging were slightly mummified, but when touched they crumbled to pieces beneath the finger.

The female colony was considerably larger, twenty-four adults and fourteen young, only four of which were males. All were hanging head downwards and were bunched very closely together. One young female was attached to the wing of an adult, but otherwise there was no overlapping. In this colony there was little or no awareness of my presence, certainly nothing definite as in the male colony ; nor was there any sign of movement, despite the mild days, until March 13th, when all the young and eight of the adults were showing signs of life. On the 14th sixteen adults were lively, and on the 15th all the young and these sixteen adults left the hibernaculum, more or less together, at 6-17, returning in quick succession from 6-47 onwards. On the 21st these survivors were joined by the six males, a reunion which occasioned much squeaking. The barn then contained a total population of thirty-six, and this population continued to use the premises until April 9th.

During this winter—actually at the very end of the winter when signs of life were returning—I ringed the right foot of each bat, yellow rings for the adults and green rings for the young.

(*To be continued*)

The Entomologist for June contains ' Notes on Lepidoptera at the Lizard in 1940,' by G. C. Clutterbuck ; ' On Rearing Lepidoptera,' by F. Littlewood ; ' *Callicera rufa* Schummel (Diptera Syrphidæ), Colour variation of abdominal hairs in the adult, with a note on longevity of the larva,' by R. L. Coe ; ' Further revisional notes on Malayan Rhopalocera,' by A. S. Corbet ; 'A new *Teredolaemus* from New Britain (Coleoptera Colydiidae),' by H. E. Hinton ; and several notes and observations.

WILD LIFE CONSERVATION

G. W. TEMPERLEY.

In a recent paper read before the Dominions and Colonies Section of the Royal Society of Arts, Mr. C. W. Hobley, C.M.G., for many years Secretary to the Society for the Preservation of the Fauna of the Empire, dealt with the important subject of Wild Life Conservation in its wider aspects. His excuses for introducing such a matter in war time, if such be needed, were, first, that we must look forward to a time when we shall once again be able to enjoy the precious gifts with which nature has endowed us, and, second, that in the post-war period many territorial adjustments, followed by movements of population, will inevitably take place, particularly in Africa, now the main reservoir of wild life. Unless, therefore, a sound policy of conservation be envisaged beforehand and be generally accepted by public opinion, much loss may result. After outlining briefly what has already been accomplished in various countries, mainly through the initiative of the British in the Dominions and Colonies, and that largely instigated by the Society for the Preservation of the Fauna of the Empire, Mr. Hobley pointed out some of the difficulties and complications with which schemes for conservation have to contend. It is a comparatively easy matter to arrange International Conferences and to pass resolutions, but not so easy to persuade governments to act upon them efficiently ; for the establishment and control of game reservations can only be carried out by Game Departments which are able to take into account and provide for a large number of complex, varying and inter-related circumstances. The welfare of the native inhabitants of the area must not be interfered with ; they must have ample and suitable space where their herds shall be safe from the attacks of the larger carnivores and their crops secure from destruction by herbivores ; while land suitable for agricultural development by European settlers must not be encroached upon. The eradication of the tsetse fly, now taking place, is steadily opening up new areas for settlement which were formerly only occupied by wild game immune from its attacks, and this valuable work of reclamation must not be hindered. The danger must be guarded against of too large aggregations of herbivorous animals becoming the breeding grounds for rinderpest and other diseases which spread to native-owned cattle ; while any sudden reduction in the number of herbivores may drive the larger carnivores, which preyed upon them, to attack domesticated animals. The often quite unexpected result of human interference is exemplified by a case in which the prohibition of grass burning by natives, in the supposed

interests of wild life, resulted in the development of scrub-land and the ruin of the pastures, so that the game which was to be protected migrated elsewhere. The management of a game reserve, therefore, can only be successfully carried out by a staff of trained men who must understand not only the habits of the animals to be preserved, but also the whole complicated ecology of the country in which they are to operate, the customs of the natives, and the policy and outlook of the government of the territory concerned. Anything short of this will result in failure. The upkeep of a reserve becomes, then, a very costly undertaking. In the very successful and famous Kruger National Park the cost of maintenance is fully recouped from the fees charged to visitors, who flock to see it from the populated areas of the Dominion of South Africa ; but in remote areas of Central Africa no income from such a source can be expected for very many years to come, while the expense of controlling the size of the herds, reducing the number of carnivores and patrolling the confines of the reserve to keep out illicit hunters, particularly if elephants be present, is greatly increased. Mr. Hobley considers that a difficult and critical period has now begun and that upon the action taken during the next ten years or so will depend the fate of wild life in most parts of our Empire and that, therefore, the S.P.F.E., which, with its 32 years of experience, knows what must be done, should be more widely supported and provided with funds, so that it may educate public opinion both at home and abroad in the direction of a balanced view of the situation in all its aspects.

The paper deserves the careful study of all those who, for cultural, scientific, or sporting reasons, desire to see the successful preservation of as much as possible of the natural fauna of the earth. If man, by virtue of his reason, is the dominant species, he must use that reason to exercise a wise control and not permit, by neglect or by a too short-sighted policy, irreparable harm to befall that wild life of the earth which it is in his own highest interest to conserve.

In Memoriam

GEORGE HENRY CATON HAIGH

G. H. Caton Haigh, of Grainsby Hall, near Grimsby, passed away on February 11th at the age of eighty. He was one of the oldest members of the Yorkshire Naturalists' Union, having been elected in 1887. All his contemporaries such as W. H. St. Quintin, T. H. Nelson, W. Eagle Clarke, Fred Boyes and others have, alas, gone before him.

He was a very fine sportsman, and a reliable and accurate field ornithologist, and has been the means of adding several

species of birds to the British List, chiefly among the passage autumn migrants. He was not one who wrote much, but appeared contented for the most part to leave it to others to publish the results of his work and researches, although he sent several short notes to the earlier numbers of *British Birds* (magazine), from which the following extracts are taken. They were all obtained in the North-eastern corner of Lincolnshire, and mostly in the neighbourhood of North Cotes :—

Notes on the Yellow-browed Warbler : Vol. II, p. 233 ; Vol. III, p. 224 ; Vol. IV, p. 209, and Vol. VI, p. 313.
Notes on the Red-breasted Flycatcher, Vol. III, p. 226 ; Vol. XVI, p. 326, and Vol. XXIII, p. 339.
On the Barred Warbler, Vol. II, p. 232.
On the Buff-breasted Sandpiper, Vol. II, p. 241.
On Sabine's Gull, Vol. II, p. 241.
On the Lanceolated Warbler, Vol. III, p. 353.
On Richard's Pipit, Vol. IV, p. 312.
On the Squacco Heron, Vol. IV, p. 252.
On the North American Peregrine,[1] Vol. V, p. 219.
On Albino Pink-footed Geese, Vol. XXIII, p. 240.

To the same journal he contributed a useful and valuable article, ' On Pink-footed Geese ' (Vol. XXVIII, pp. 368-370), giving the differences in their plumages, etc., their food, and the individual weights of 337 birds shot by himself and carefully weighed.

No one knew the wild geese around the Humber mouth better than Caton Haigh, and probably no man ever spent more time among them.

It is well known that his notes greatly assisted the late John Cordeaux in collecting information around the mouth of the Humber, for the British Association Committee, ' On the Migration of Birds as observed on the British and Irish Coasts.'

The illustration of the Yellow-browed Warbler in Howard Saunder's ' Manual of British Birds ' (1899) was figured from a bird shot by Caton Haigh at Great Cotes on October 7th, 1892.

I feel that I cannot do justice to the memory of Caton Haigh without taking the following from his obituary in the current number of *The Ibis* (pp. 467-8) : ' In the course of years Caton Haigh procured on 1st October, 1898, the first example in Europe of Raddi's Bush-Warbler, as well as the first records of the Greenish Willow-Warbler on 5th September, 1896, and Lanceolated Warbler on 18th November, 1909, for

[1] This bird was taken in the nets of a man who was engaged in netting plovers on the coast.

the British Isles. Among other rare wanderers he shot Eversmann's Warbler, Yellow-browed Warblers, Sabine's Gull, Buff-breasted Sandpiper, and an American Peregrine—the second to be recorded from these islands. This last bird was caught in a net, but, suspecting it was the American race, forwarded it to Dr. Hartert, who confirmed his identification. In 1938 he presented his collection of bird-skins to the British Museum.'

Besides his considerable home estate in Lincolnshire, he also inherited properties from his father in Yorkshire and in Wales. In the latter place (Merionethshire) he possessed a fine collection of Rhododendrons.

He was a Fellow of the Zoological Society, and a Life Member of the British Ornithologists' Union.

His remains were laid to rest in the little Churchyard at Waithe, in the neighbourhood where he had spent so many happy sporting hours, which he continued almost to his end—even shooting when he was on crutches.—H.B.B.

THE YORKSHIRE NATURALISTS AT ROCHE ABBEY

The first meeting of the Union in 1941 was arranged for May 17th, and two weeks prior to this very little growth could be seen, the cool and very dry weather held everything back, but fortunately things changed, and plants and insects appeared just in time to make the meeting a useful one. Some members doubted the wisdom of holding field meetings under present war conditions, but the attendance at Roche Abbey, over forty people sat down to tea, proved the wisdom of keeping the activities of the Union going, and a large proportion of those present came from the Sheffield area, where the war cloud hangs heavily.

Mr. Ralph Chislett writes: At this meeting, in an old haunt of woodland and waterside species that I have known since boyhood, the identification of 43 species gave evidence of the failure of the establishment of Maltby Main Colliery, and of the magnification of what used to be a small, picturesque, agricultural village into an industrial townlet, to destroy the ornithological amenities. There are not many places in Yorkshire where some six or seven cock Blackcap Warblers could be heard singing in the course of a morning's walk, as was the case here. The British breeding phylloscopi were all noted. The Great Spotted Woodpecker and the Nuthatch were heard and seen. Blue, Great, and Cole Tits, and the Wren were in song, the latter species showing marked recovery from its numerical, frost-caused, poverty of 1940. But the Goldcrest is still absent from the yews that formerly attracted it. The nesting season was noticeably late, and few nests were seen beyond those of the three turdidæ, in only two of which had the eggs hatched as yet, and of such other early nesters as Hedge Sparrow and Pheasant, Jackdaw and Stock Dove were flushed from different holes in the same tree, but the tree was not climbed.

Botany (W. A. Sledge): The area covered by the excursion forms part of a district which was assiduously worked by Jonathan Salt over a century ago. The large number of uncommon plants found by him testifies to the former richness of the flora. It was gratifying therefore to one who had never previously visited this outlying corner of the county to find that the passage of time had dealt less destructively with

the plant life than is the case with so many adjacent districts in South Yorkshire. Despite the proximity of collieries the country around Roche Abbey still preserves its old rural attractiveness, and the flora still yields many of the good things of former years. How many it was impossible to judge on the basis of this excursion, as the earliness of the visit and backwardness of the season prevented our seeing the district at its best. King's Wood and the pastures and woodlands immediately adjoining the Abbey were the most productive parts. The extensive King's Wood affords a good example of woodland development on magnesian limestone, and a notable feature of this wood in which Spindle Tree, Dogwood and Privet are common shrubs, is the quantity of Yew and their large dimensions. The very extensive carpets of Lily-of-the Valley which is co-dominant with or even largely replaces Dog's Mercury over wide areas is a striking feature of the ground flora. Daffodils were abundant on the fringe of the wood, but these had finished flowering. *Viola hirta, Primula veris* × *P. vulgaris, Lathræa,* a few plants of *Aquilegia* and a patch of *Calamagrostis Epigeios* (which was also seen in a wood bordering Maltby Common) were the most interesting of the other species noted. Near the Abbey *Helleborus viridis, Ranunculus auricomus, Viola odorata, Adoxa moschatellina* and *Ophioglossum vulgatum* were seen, while *Claytonia perfoliata, Ribes alpinum* and *Inula Helenium* occur as escapes or introductions near the Abbey House. *Parietaria* is common on the limestone rocks near the Abbey. Other species noted about Roche or in the course of the walk to the Abbey *via* Maltby Common were *Hypericum hirsutum, Lathyrus montanus, Galium mollugo, Asperula odorata, Valeriana dioica, Taraxacum palustre, Lithospermum officinale, Lamium Galeobdolon* and *Orchis mascula.*

After the meeting Mr. J. S. Griffith took me to a locality near Braithwell, where *Helleborus viridis* and *Gagea lutea* were both very plentiful, the former unquestionably native here. A visit to Hatfield Common with Mr. R. Chislett on the day following the excursion enabled me to see *Andromeda polifolia* in good quantity and flowering freely. It is known to occur on Goole Moor and Thorne Waste, and is probably the last of the many rare marsh species which grew formerly over the whole area to survive on all three of these moors.

Conchology (Mrs. E. M. Morehouse).—There were many slugs under logs in the woods around the lake and the overflow at Roche Abbey. The smaller helices were to be found in the same situations and under stones, but on the whole it was very dry for good collecting. Only one specimen of the larger helices was observed.

Seven aquatic species were found ; two of these were found on the bowl in which some Water Starwort had been placed.

The molluscs are :

Arion ater L.
A. ater L. var. *aterrima* Taylor.
A. ater L. var. *rufa* L.
A. ater L. var. *swammerdamii* Kal.
Limax maximus L.
Agriolimax agrestis L.
A. agrestis L. var. *brunnea* Taylor.
A. agrestis L. var. *reticulata* Müller
A. agrestis L. var. punctata Picaid.
A. agrestis L. var. *pallida* Schrenk.
Vitrea alliaria Müller.
V. cellaria Müller.
Vitrea nitidula Drap.
V. pura Alder.
Euconulus fulvus Müller.
Arianta arbustorum L.
Limnaea pereger Müller.
L. truncatula Müller.
Physa fontinalis L.
Planorbis fontanus Lightfoot.
P. crista L. = *P. nautileus* L.
Pisidium pusillum Gmelin.
Acroloxus lacustris L.

Entomology (C. A. C.) : Insects were not plentiful, and only diptera were collected. Among these one of the mud-loving species,

Pelina ænea Hal., is an addition to our list. A species of the biting sandflies, *Simulium ornatum* Mg., was fairly plentiful but did not appear to trouble anyone. The large black *Bibio marci* L. was fairly common in sunny corners, though the sun was seldom seen. *Tipula hortulana* Mg. and *T. lateralis* Mg. were caught occasionally, and some other Limnobids were *Poecilostola punctata* Schrk., *Tricyphona immaculata* Mg., *Dicranomyia chorea* Mg., *Erioptera diuturna* Walk., *E. trivialis* Mg., *Symplecta stictica* Mg. There were a few hover flies including *Chilosia honesta* Rnd., *Ascia podagrica* Fab., *Eristalis arbustorum* L., *Platychirus manicatus* Mg., *Melanostoma mellinum* L., a single fungus gnat, *Boletina trivittata* Mg., and others taken were *Themira putris* L., *Rhamphomyia sulcata* Fln., *Siphona cristata* F., *Hylemyia nigrimana* Mg., *Exorista vulgaris* Fln., *Borborus geniculatus* Mcq., and *Sphærocera subsultans* F.

Fungi (W. G. Bramley).—Were rather on the scarce side, and the preceding weather had not been favourable for the development of the larger species. The large size of some of the specimens of the Myxomycete Reticularia was striking, several being seen with a diameter of six inches or more.

(* Not listed for V.C. 63 in *Catalogue of Yorkshire Fungi*.)

MYXOMYCETES

Reticularia lycoperdon Bull. *Lycogola epidendrum* Pr.

PHYCOMYCETES

Plasmopara pygmoea (Ung.) Schroet., on anemone.
Peronospora ficariæ Tul., on *Ran. ficaria*.
P. schleideni Unger, on Allium.

ASCOMYCETES

Morchella esculenta Pers.
**Peziza venosa* Pers.
Aleuria ampliata (Pers.) Gill.
Leptosphæria acuta (M. & N.) Karst., on old nettle stems.
**Ophiobolus acuminatus* (Sow.) Duby., on old thistle stems.
Cryptosporella hypodermia (Fr.) Sacc.
Diatrype stigma (Hoffm.) Fr.
Ustulina vulgaris Tul.
Hypoxylon coccineum Bull.
Xylaria hypoxylon (Linn.) Fr.

BASIDIOMYCETES

Ustilago longissima (Sow.) Tul., on *G. aquatica*.
Urocystis anemones (Pers.) Went., on Anemone.
Melampsora rostrupii Wagner. I, on Mercurialis.
Uromyces ficariæ (Schum.) Lev., III on *Ran. ficaria*.
U. dactylidis Otth. 01 on *Ran. repens*.
U. poæ Raberh. 01 on *Ran. ficaria*.
Puccinia violæ (Schum.) DC. 01 on *V. riviniana*.
P. fusca Wint. III on Anemone.
Polyporus squamosus (Huds.) Fr.
P. betulinus (Bull) Fr.
P. radiatus (Sow.) Fr.
Mycoleptodon ochraceum (Pers.) Pat.
M. fimbriatum (Pers.) Bourd.

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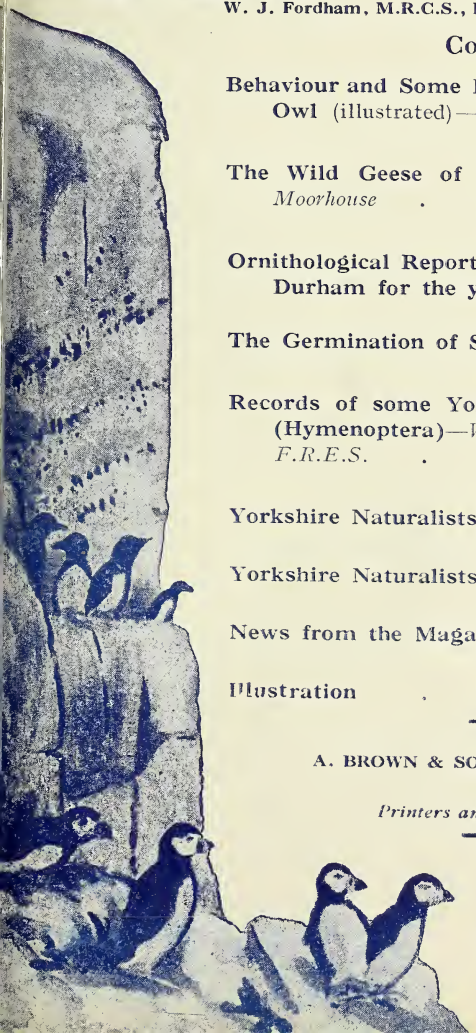

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YORKSHIRE NATURALISTS' UNION

SECTIONAL MEETINGS

Oct. 4—Leeds University, Geological Department.
Geological Section ... ... 3 p.m.
Conchological Section ... ... 3-30 p.m.
Fresh Water Biology Committee 4 p.m.

Oct. 11—Leeds University, Botanical Department.
Botanical Section ... ... 3 p.m.

Oct. 18—Leeds.
Vertebrate Section ... ...

Oct. 25—Leeds.
Entomological Section ...
Plant Galls Committee ...

AN APPEAL

OWING to the present paper situation and the loss by enemy action of the publishers' stocks in London of *The Naturalist*, the issues for January to April of the present year are now out of print. In the special circumstances, the Editors would be very glad if members of the Y.N.U. who do not retain their copies for binding and are now finished with the numbers referred to above, would send them to A. BROWN & SONS, LTD., 'C' Dept., Perth Street West, Hull. Such copies would be placed at the disposal of the Y.N.U. to enable new members to receive the complete issue for the current year.

YORKSHIRE NATURALISTS' UNION

GEOLOGICAL SECTION

Temporary Sections and Borings Committee

Members and associates of the Union, whether geologists or not, are asked to report immediately to the undersigned all cases of new sections or borings occurring in their districts. These records are of vital importance to the progress of geology in the county.

J. A. BUTTERFIELD, M.Sc., F.G.S. (*Secretary*),
32 Ashfield Drive, Frizinghall, BRADFORD.

BEHAVIOUR AND SOME HABITS OF THE SHORT-EARED OWL

RALPH CHISLETT

RECORDS of the Short-eared Owl (*Asio f. flammeus*) as a breeder in Yorkshire are somewhat occasional in a number of districts. Occurrences in winter inland in Holderness, and on the lower-lying moors of central, south, and west Yorkshire, and to a lesser extent on some of the higher ground farther north, are more regular. But much more regularly is the bird seen on the coast. Near to Spurn of recent years I have seen odd birds at dates varying between April 18th and October 29th, and in every month between except May, for which month there are no recent Spurn records of the species ; an earlier record there relates to February 15th. Those birds arriving on the Yorkshire coast in autumn may have come a long way south, for the breeding range of the species extends to 70° N.

Frequently the bird is disturbed from the marram grass between Kilnsea and Spurn, and seldom does it fly far away. One bird disturbed from a post on July 25th, 1939, first hawked about above some mown grass, then alighted on a swathe, and watched me pass at 20 yards, when the lemon of its irides was clearly visible. Birds may also be observed similarly in the north of the county near to the Tees-mouth. From these places the birds pass to any wild stretch of open country on which there are sufficient voles to provide food. Sometimes a number of birds may winter in the same area. Some of the Humber arrivals no doubt pass on to Lincolnshire. Birds wintering in Yorkshire other than in the south of the county are more likely to have come *via* the Tees-mouth, or from farther north in England ; unless perchance the supply of voles of an area where a pair of Short-eared Owls have bred has proved to outlast the considerable needs of the breeding season. The only records of ringed Short-eared Owls of which I have a note show an easterly movement of the specimens concerned in late summer or autumn, but how far they can be taken as representative of the species is another matter. Two birds ringed as nestlings from the same nest in Norfolk on May 16th, 1933, were recovered, one on September 14th, 1933, in Monmouthshire, and the other on October 24th, 1934, at Malta.

To watch the species in a breeding haunt I resorted to an area of Border country to which my attention was first drawn by Mr. Russell Goddard, of the Hancock Museum, Newcastle, in his article in *British Birds* of March, 1935. For the opportunity to see the species under such unusual conditions as are now to be described I was indebted to my friend,

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G. K. Yeates, whose desire to obtain photographs of a nesting Woodcock in my own district paved the way.

April, 1939, was well advanced when Yeates reported the discovery of two nests, and by the 25th the number had reached four. One situated in long tussocky grass contained six young, the youngest of which had only recently hatched, the eldest being already more than a week old. A second pair, with three young and one egg in the nest, and another egg lying outside, had chosen the edge of a patch of heather amid the grass of a hillside overlooking a valley and a burn. A third bird sat under the lea of a big, whiskery tussock of rush, about 100 yards distant from a moorland road, and had seven eggs. The fourth pair had seven eggs in a hollow between long tussocks of grass above the banks of a burn in the hills. The eggs in the last two nests did not begin to hatch until early May.

All the Short-eared Owls were confined to a huge area of moorland grass and heather in process of afforestation, much of which already bore young conifers. Everywhere among the young trees were vole-runs through the grass. Over the miles of such countryside we traversed, our estimate of the number of pairs of Short-eared Owls with territory exceeded thirty pairs. In some areas pairs of birds were not far distant from each other, and hunting cocks might meet, when one of them would give right of way. On cold mornings few birds were seen, or during rain, but when the sun shone after a shower, and in the evening, owls might be seen quartering the ground in every direction. Many a pounce was fruitless so far as the lack of prey hanging from talons might indicate. Possibly a vole observed took shelter in time. In Lapland I have seen the species hunting for lemmings, and have heard the animal's shrill cry as it dived for cover to avoid the winged fate overhead, still sometimes 20 yards away or more. The voles, however, were soundless, or at any rate inaudible to our ears.

Short-eared Owls sitting on eggs usually allowed us to approach so closely that birds were sometimes stalked photographically, when one knew beforehand where they sat. The bird reproduced allowed Geo. Yeates to remove the hide he had had in position for some days and to return across the burn, after which I approached to erect my hide at the same place, and when I had finished the bird still brooded with 'ear-tufts' erected. The burn was in spate that day, necessitating the use of Yeates' thigh boots in which to cross.

Subsequently I passed several days inside the hide for I wanted to see the birds' natural behaviour. Generally, after camera and all had been duly fixed in position, to flush the brooding bird was the last duty performed by my wife before she waded back through the burn, and retired to the closed

car by the roadside, for the weather was very cold. Rain, snow, hail, and sun alternated during the days we passed there ;

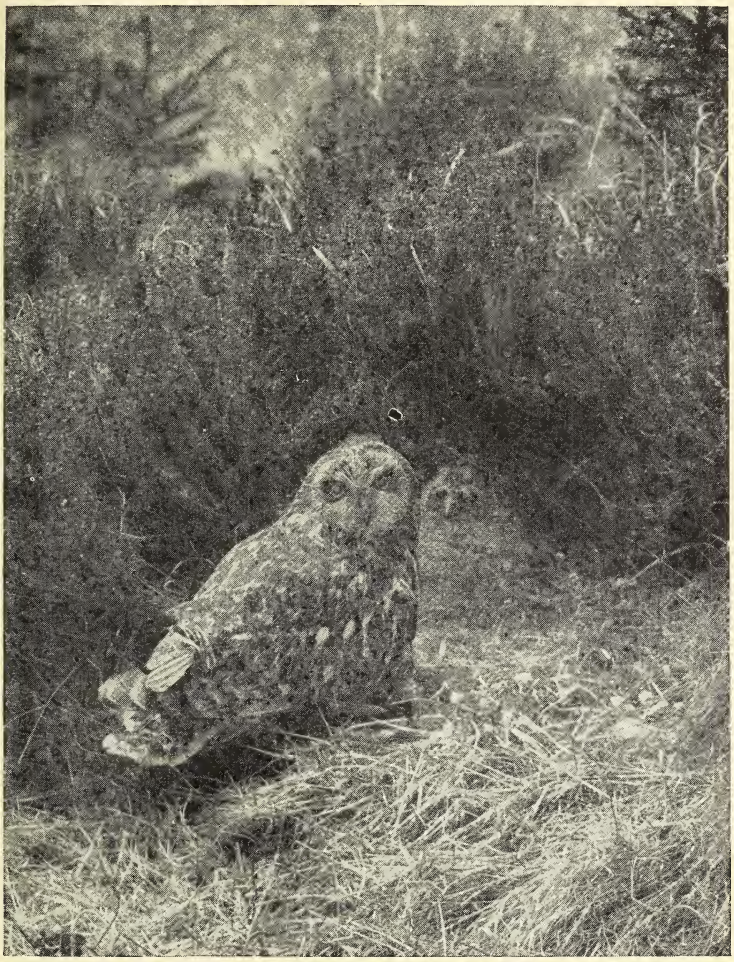

Photo by] **Short-eared Owl** [*Ralph Chislett*

none of them lasted long. Cold winds always blew, necessitating overcoat and gloves for the watcher in the hide.

Generally a quarter of an hour elapsed before the bird made itself visible. Sometimes first it flew to perch in a straggling birch or thorn, and thence to the ground beyond the nest. Next it would spring over the little firs to the heather at the back of the nest, usually pushing its way through

nonchalantly and leisurely, entire lack of suspicion being evidenced by the absence of erected 'ear-tufts.' Only on occasion did the bird alight directly into the nest. If my wife retired leaving the owl brooding, the 'ear-tufts' soon subsided until they became invisible, and unless alarm was caused they were not seen again until my wife returned to release me.

For some time the owl would brood without movement, until restlessness underneath became apparent. A more erect position was then assumed. The landscape was scanned. The bird stood on its short legs, and after a last look round would pick up one of the short-tailed field voles, of which one or two were usually lying by the side of the nest. The performance of tearing up the vole resembled the procedure of most birds of prey when feeding their young, excepting that the portions given to the young owls were larger than those fed to their young by the smaller hawks. Some of the lumps swallowed by the young owls were astonishingly large. The eldest owlet tried to swallow the disembowelled tail-end of a vole on one occasion ; several gulps were required, and for some time the vole's tail remained protruding from the mouth until a last gulp took it out of sight.

The first sign of the presence of the cock bird was usually a muffled and deep 'hu-hu-hu' from the hillside above, which reminded me of the sound of lapwing's wings. The sound came intermittently, and the hen gave no sign of having heard it until he flew over us, calling as he flew. In his claws would be a vole. As he flew over the hen looked upward, and with a snarling expression opened her mouth wide to give a catlike 'ycha.' The cock would then sometimes alight on a nearby hillock and call again. On hearing the catlike response again, he flew low over the ground, and with wings still quivering, alighted by the nest, released his hold on the vole, and flew off without having folded his wings. Without an answer to his call food was not brought, and the inference seemed to be that it was not required for the present.

On May 1st we waited in the car and watched the site for some time. Along the valley the cock hawked about flapping slowly and low, like a very large-bodied moth, over the tussocks and young trees. Sometimes he dropped, but was usually on the wing again in a couple of seconds. At last he arose with a vole, and we thought it was time for one of us to be inside the hide. From a point some 15 yards from the nest he watched us cross the burn, then flew farther up the hill as we climbed. There was no food in the nest when we reached it at 11-15.

At 1-25 the 'hu-hu-hu' sounded very near to me, and I spotted the producer on the hillside above. As he called,

his head was held forward, and it bobbed with the note. The hen responded with a ' ycha ' several times. Presently he winged down to the nest, alighted with his back to me, and sprang away as I released the camera shutter. The hen had taken the food from his foot as he alighted. Feeding ensued, and the meal was scarcely finished when the ' hu-hu-hu ' sounded again. I saw he was carrying another vole. The hen made no response, and the cock disappeared, probably to eat the vole himself.

At 2-5 the cock's deep voice was again heard, and the hen responded. He alighted facing me and turned towards the hen, quickly picking up the vole in his beak, passing it to the hen, and flying away. The sun had now come through the clouds and hunting Short-eared Owls were more active. Probably the sun brought out the voles too and made them easier to secure.

On May 2nd, at 10-15 a.m., there were two voles in the nest. These I moved a foot away and tethered to a peg pushed into the ground. After my wife had gone the hen soon arrived and began to show signs of desire for food. The young, too, were restless. She had evidently already espied the two voles, and out from the nest she came to fetch one, stealing down in a very cat-like manner and reminding me once again of the aptness of a name we had heard applied to the species in Orkney—' cattafaced hawk.' The first vole, on being picked up, came away from the peg quite easily. During the meal, at the end of repeated gulpings, an owlet with the tail-end remnant sticking out of its mouth had to reverse, which proceedings its parent watched with interest, then retrieved the lump and pulled it into smaller pieces, and fed them to the same owlet.

Soon afterwards the cock arrived to alight in front with a vole, transferring it from foot to mouth before passing it to his mate. When leaving he spied the tethered vole and dropped on to it to pick it up. The string held this time and after half a second of wing-flapping and pulling he left it. At that moment I noticed that the hen was in the act of swallowing whole the vole her mate had just brought, and quite forgot to release the camera shutter until the vole had disappeared at a gulp. Shortly afterwards she came out to fetch the remaining vole. Picking it up carelessly she was surprised to find it apparently jerked away. Then she stood over it and tugged mightily until the vole divided. At the click of the shutter she suddenly appeared to suspect something and flew away, returning in a few minutes to alight directly into the nest, then settled down to brood. At 1-30, when the young became restless, the old bird came out to have another tug of war with the peg for the possession of half a vole, and

won. Seldom have I met with a cooler avian customer, or had a more interesting couple of hours.

One incident with this bird of character had humour. A restless owlet had pushed itself from the nest and clambered on to its parent's back where it surveyed the world very contentedly. Over the many square miles of spruce-planted ground a few sheep still grazed. They did not seem to touch the conifers. One old blackface came grazing towards us, occasionally raising its head to eye the hide, and ambling a few yards nearer before bending to graze again. When the sheep was 3 or 4 yards away the owl suddenly became aware of it, and with a shuffle of feathers dislodged the owlet from her back and took it into safe custody below. Again the sheep advanced until the lowered head was only a foot from the owl. The bird's head was now fixed towards the sheep, and its legs appeared to be held ready for a spring, but after staring for a minute or more the blackface raised its head and turned away, not liking perhaps the appearance of that bullet head and those staring yellow eyes. I should like to have seen the dénouement that might have followed had the sheep come any nearer.

One day I waited by another owl's nest which held young at various stages of growth. As the cock bird flew past he gave a form of display, clapping his wings smartly underneath his body four times, producing quite a loud noise ; as he did so he lost a little altitude. The performance reminded me of children who try to get in as many claps as possible before a ball they have thrown into the air comes down to be caught again. We never saw or heard the photographed bird behave in this way, but another cock clapped its wings below its breast several times apparently for our benefit. We had disturbed this bird from its stance on a hillside, near to which were several castings, but we never found his mate.

Often from the hide I could see the cock owl below, floating along over the grass, heather, bracken, and young trees. A pair of Carrion Crows were building in a tree in a nearby hanging coppice. The owls did not like them, and the cock devoted a good deal of attention to them, driving them away repeatedly until for a time they desisted, and stationed themselves in some trees farther away. I remembered that in Norfolk once I had seen the rivalled determinations of these two species exemplified to perfection. These owls had a nest with young in some rushy ground. Although at a good height a foraging Carrion Crow was told in unmistakeable fashion ' you shall not pass.' Time after time the crow was driven back, only to turn and try again at a higher altitude. Still he found the old Short-eared Owl bouncing about in the air before him, and back again he had to go. For some ten

minutes the attempts of the crow to pass were frustrated until the birds appeared like small passerines so high were they above. Eventually the crow made a considerable detour ; he certainly did not pass over the home territory of that owl.

In Orkney, where the species breeds regularly, probably as a result of the regular and plentiful supply of plump Orkney voles, a Short-eared Owl had to give way perforce to numbers. Some gulls coveted the fat Orkney vole carried by the owl and mobbed him unmercifully. Persistently the owl followed its course, albeit with many swerves to avoid the rushes of the gulls. Not until a hungry female Hen Harrier joined the party did the owl drop its vole. The Harrier secured the vole.

Short-eared Owls have been known in this Border district as more or less occasional breeders for many years. The treatment of the ground over great areas of moorland, given over hitherto to Golden Plovers and Curlews, and where Blackgame are more numerous than Red Grouse, whereby great rectangular clods are dug from the wet peaty ground, turned over, and planted with seedling conifers, has seemed to encourage voles which the owls have dealt with faithfully. At the end of April, 1940, by permission of the Forestry Commission, I was able to pay a short visit to the district again. Voles were very much less in evidence than they were in 1939, and few of their ' runs ' could be seen. In the area on which we had seen more than thirty pairs of Short-eared Owls in 1939, we had difficulty in 1940 to locate seven pairs, and those were widely scattered, mainly in the hills, but still confined to ground being afforested. The season, too, was later. Only one of the seven pairs was seriously suspected of having even eggs, although they certainly had selected their territories, which were very much wider than those of the birds there in 1939. Consequently detailed search of the ground, and careful watch in the hope of seeing a cock owl take its prey to its sitting mate alike proved fruitless. Each of one pair were seen to enter a hollow amid some rushes, but castings were all it contained, then and for some days afterwards. The one pair of birds with eggs had only four.

After much waiting, watching, and wandering, my colleague, T. M. Fowler, sat himself down on the side of a gully to rest. On the opposite side was a clump of rushes, such as he knew to be suitable cover for a Short-eared Owl. Casually he raised his glasses to scan the rushes, and a Short-eared Owl's face was framed there. A couple of hours later we glassed the sitting bird at 30 yards range. As we watched she flew. I lowered my glass, but Fowler looked long enough to see a brown animal disappear from the nest side into the rushes behind, but was unable to identify it with certainty. Behind the nest was a ' run.' The nest now held three eggs.

1 Sept. 1941

Was the brown animal a rat or weasel? On the following morning all the eggs had gone.

The spasmodic appearances of Short-eared Owls at many places in autumn and winter, places much farther apart than Yorkshire and Malta, for the species is Holarctic, coupled with the irregularity with which they remain, or come to breed, over equally wide areas, add mystery to other interest. Even where it remains to breed each year its numbers vary extraordinarily with the populations of voles—or lemmings. A large number of young owls must have been reared in that Border country in 1939, probably sufficient to have quadrupled the number of owls there for 1940 had all remained or returned there to breed. But food for such numbers was not available in 1940. Instead of being quadrupled the number of owls present in 1940 was less than one-fifth of those present in 1939. What became of the others? Who knows?

THE WILD GEESE OF NORTH LANCASHIRE

SYDNEY MOORHOUSE

No finer instance of the way in which local bird life changes with the passing of years can be found than that afforded by the status of wild geese on the marches bordering Morecambe Bay and the Lune estuary. Leighton Moss and the marshes off Silverdale and Overton are frequented by large skeins of Grey-lags (*anser anser*) throughout the winter months, and last winter White-fronted Geese (*anser albifrons*) were numerous on the marshes around Cockerham and Pilling, on the south side of the Lune Estuary. The Pink-foot (*anser brachynrhynchus*), which congregates in large numbers in the Solway Firth and on the Ribble Estuary marshes, occurs on passage in autumn and spring but rarely stays in the district.

Howard Saunder's revised edition of Mitchell's *Birds of Lancashire* (issued in 1892) contains some very interesting references to wild geese on the North Lancashire coast which, in view of the present-day status of the different species, are well worth quoting. We are told: 'The various species of Geese are seldom seen on the coasts of Lancashire except at the seasons of migration, and they appear most frequently in October and March. During hard frosts, however, or after storms at sea, they have often been observed in the remaining winter months, and flocks have been occasionally seen flying northward as late as June, and southward as early as September. These flocks usually fly at so great a height that it is impossible to distinguish the species, and there is considerable difference of opinion as to whether the present (the Grey-lag) or the Pink-footed Goose is of more common occurrence. The Grey-lag Goose has been shot many times round Morecambe Bay, and also on the inland reservoirs, and

no doubt passes through every winter. Mr. T. Jackson says that, from his station at Overton on the Lune, the Grey Geese always go north-east in spring, and south-west in autumn, in flocks both large and small, and generally flying either in a straight line or in the form of a wedge.'

In the same work Mr. R. J. Howard adds : ' For several years I have taken much interest in the distribution of Grey Geese in Lancashire, and never missed an opportunity of seeing any birds killed in the county. The Ribble Estuary is undoubtedly more frequented by Grey Geese than any part of the Lancashire coast ; about the Lune Estuary they seldom alight ; and Mr. T. Jackson, of Overton, informs me that he cannot say what species pass over during the seasons of migration, for he has shot only one Goose in his life. *I have not yet succeeded in getting a sight of a Grey-lag killed in the county.*'

Some years after the publication of this book, however, Wild Geese were noted on the Morecambe Bay marshlands and for many years the Pink-foot was the commonest of the species. In the winter of 1908-9 the White-fronted Goose established itself but this winter was an unusual one and since then the White-fronted variety has not been seen in anything like large numbers on the marshes to the north of the Lune. In the 1922-23 season (soon after Leighton Moss had been allowed to revert to its undrained condition and thus provide a succession of wet pastures) the Grey-lag appeared in large numbers and since that time it has been the predominating species of the marshlands of the Bay.

It would appear that the gradual withdrawal of the tide in Morecambe Bay has had a great deal to do with the establishment of Geese here. Gradually mud is ousting sand on the verge of the Bay and providing sustenance for the growth of vegetation. Indeed, within the past few years places that were composed of sand are now being covered with glass wort or samphire (*salicornia*) and creeping bent-grass (*agrostis stolonifera*), a very nutricious form of vegetation which gives an early bite and provides excellent food for Wild Geese.

Usually the largest skeins of Geese are seen in December and January, when they sometimes number as many as one and two thousand together. From mid-September to the beginning of November is the time when the largest flocks arrive, although an early spell of cold weather in their summer haunts has been known to send them southwards at the end of August. This year the Geese were late in arriving on the Morecambe Bay marshlands but during September (when engaged on Home Guard duties) I heard flocks of Geese passing overhead at great altitudes during the night. As Pink-footed Geese were reported to be arriving on the Ribble

marshes at that time I have no doubt that the birds I heard were of that species.

Of the species *branta*, the Brent Goose (*branta bernicla*) has been reported from Walney Island and other parts of Morecambe Bay on several occasions, and the Barnacle Goose (*branta leucopsis*), which is so common on the Solway marshes, is seen from time to time, particularly in severe weather.

From early times this latter species seems to have been known in the vicinity of the Bay. In his *Ornithology* (1678) Willughby states that it ' frequents the sea-coasts of Lancashire in the winter time ' and in the *Natural History of Lancashire* (1700) Dr. Leigh describes it as being very common. Mitchell in *Birds of Lancashire* refers to the fact that many were shot in 1878 and 1879 round the shores of Morecambe Bay.

The old superstition that Barnacle Geese hatched from a marine shell and not from eggs has a special interest as the Pile of Fouldrey, or Piel Island, off the Furness shore, was believed to have been a favourite place for their propagation. In his *Herball* (published in 1587), John Gerarde tells us : ' There is a small island in Lancashire called the Pile of Foulders, wherein are found the broken pieces of old and brusied ships, some whereof have been cast thither by ship-wracke, and also the bodies with the branches of old and rotten trees, cast up there likewise ; whereon is found a certain spume or froth that in time breedth into certain shels, in shape like those of the Muskle, but sharper-pointed, and of a whitish colour ; wherein is contained a thing in forme like a lace of silke finely woven as it were together, of a whitish colour, one end whereof is fastened unto the inside of the shell, even as the fish of Oisters and Muskles are ; the other end is made fast unto the belly or a rude passe of lumpe, which in time cometh to the shape and foreme of a Bird ; when it is perfectly formed the shell gapeth open, and the first thing that appeareth is the aforesaid lace or string ; next comes the legs of the bird hanging out, and as it groweth greater it openeth the shell by degrees, till at length it is all come forth, and hangeth onely by the bill ; in short time after it cometh to full maturities, and falleth into the sea, where it gathereth feathers, and groweth to a fowle bigger than a Mallard, and lesser than a Goose ; which place aforesaid, and all those parts adjoining do so much abound therewith, that one of the best is bought for threepence. . . . They spawne as it were in March and April ; the Geese are formed in May and June, and come to fulness of feathers in the moneth after.''

It is worthy of note that Gerarde prefaces this strange description with the oath : ' What our eyes have seene, and hands have touched, we shall declare ! '

ORNITHOLOGICAL REPORT FOR NORTHUMBERLAND AND DURHAM FOR THE YEAR 1940

Compiled and much abridged from the records of the members of the Ornithological Section of the Natural History Society of Northumberland, Durham and Newcastle upon Tyne and others, by George W. Temperley.

(A key to the initials appearing in these records will be found at the end of these notes. N.=Northumberland. D.=County Durham.)

For obvious reasons the number of reports received from members during 1940 has been much smaller than usual, but nevertheless some interesting information has come to hand as the following notes will show.

The exceptionally severe weather in the early months of the year seriously affected bird life. Heavy snowstorms were accompanied by a period of severe frost, with temperatures frequently below zero Fahrenheit in many localities. This weather continued in varying degrees of severity until loughs, reservoirs, streams and even rivers were frozen ; the Tyne being ice covered as far downstream as Dunston. The ice on Catcleugh reservoir was 15½ in. in thickness. Under such conditions large numbers of birds perished. The following extracts from a report sent in by Mr. Sidney Ash describe the conditions along the shore near Beadnell, N.

'During the abnormally cold and stormy weather of January and February, enormous flocks of land birds congregated along the tide line in search of food ; and great numbers, suffering from exposure and starvation, fell victims to the depredations of Gulls and Carrion Crows. Amongst the dead sea-birds found, excluding Gulls, the most numerous were Razorbills, Guillemots, Puffins, Shags, and Grebes. Waders were rarely found, and they appeared to suffer less discomfort and find little difficulty in obtaining food during the most severe spells of weather. Towards the end of January a large flock of Little Auks, consisting of about 300 birds, appeared in the bay where they remained, their number rapidly decreasing, until the end of February. From their first arrival dead birds were found along the shore, and on examination it was noted that the first victims were plump and in good condition, though containing no food ; as time went on their condition deteriorated ; they daily became weaker on the wing and consequently more easily fell victims to the Gulls and Crows which drove them ashore and quickly destroyed them. It is doubtful whether any of the Little Auks which arrived on this coast survived for more than a few weeks. During the same period Grebes of various species arrived in the bay in small parties and many were found dead on the beach.'

There was also much loss of bird life inland, and this made itself felt during the rest of the year. Robins, Wrens, and

Hedge Sparrows were reported as being scarce in certain areas and Tits were much reduced in numbers. The ' dawn chorus,' usually dominated by Song Thrushes, was led by Blackbirds in the spring of 1940. In a Stocksfield garden, of five nesting boxes, normally all used, only two were occupied in 1940.

Classified Notes

Raven.—Few nests were visited in 1940, but one pair in the North Tyne area bred successfully.

Hooded Crow.—Again very few records. April 5th, two at Beadnell, N. April 17th, one at same place (S.A.). October 21st, two near Warkworth, N. (E.M.).

Starling.—Flocks notably fewer and smaller during and after the severe weather.

Hawfinch.—A pair bred at Newton Hall, Stocksfield, N., fledging June 7th to 8th (H.T.). In July a nestling was picked up dead in Blagdon Park, N., by the Hon. Nicholas Ridley. A pair has bred regularly for several years within the municipal boundary of South Shields (H.M.S.B.).

Siskin.—March 7th, six seen near Alnwick, N. (J.E.R.), the only record received.

Bullfinch.—Increasing yearly in Wear valley, D. (J.G.).

Northern Bullfinch.—December 14th, a bird thought to have been of this sub-species was seen near Warkworth, N. (E.M.).

Crossbill.—The flock recorded as having wintered near Slaley, N., for several years disappeared before the severe weather in January and has not been observed since. For the first time for several years no reports of this species were sent in.

Snow Bunting.—December 25th and again a month later, a flock of 40 on Alnmouth links, N. (J.E.R.).

Nuthatch.—A single bird was seen in the Wolsingham district of Weardale, D. (J.G.).

Willow Tit.—In March a pair was identified near Dilson, N. (H.O.B.). During four years of careful search none has yet been found in the neighbourhood of Stocksfield, N., where the March Tit is frequent (G.W.T.).

Spotted Flycatcher.—On June 2nd a pair was seen in Brandling Park, Newcastle, by J. F. Stewart.

Pied Flycatcher.—Not so numerous as usual in the Stocksfield, N., area (G.W.T.).

Whitethroat.—During June a cock was heard singing in Exhibition Park, Newcastle. On the 30th two broods of young were being fed in the shrubbery skirting the lake, so probably the birds were bred in or near the park (J. F. Stewart).

Fieldfare.—Absent except on the coast during the severe weather. Flocks lingered until the beginning of May near Warkworth, N. (E.M.)

Blackbird.—On February 17th, one found dead at Embleton, N., which had been ringed in Heligoland. Blackbirds appeared to suffer less than most other species in the severe weather and were plentiful during the summer.

Dipper.—At various times between May and November a single bird was observed in Jesmond Dene, Newcastle, and on September 4th two were seen together (W.A.W.).

Little Owl.—One seen on April 23rd near Beadnell, N. (S.A.).

Barn Owl.—Gradually becoming rare in Weardale, D. (J.G.).

Bewick Swan.—February 25th, two at Hallington reservoir, N. (H.T.).

Barnacle Goose.—On January 27th one near Beadnell, N. (S.A.).

Gadwall.—On March 29th and 30th one on a marsh near Beadnell (S.A.).

Pintail.—On March 24th three pairs on Hallington reservoir (H.T.).

Golden Eye.—The solitary female reported for the last few years as wintering on a brick-field pond at Boldon, D., did not arrive this year (C.P.).

Velvet Scoter.—On February 24th two drakes were seen fighting in a field close to the shore at Beadnell. One of them was eventually killed and proved to be in excellent condition, though other species were being washed up on the beach dead or dying from starvation (S.A.).

Goosander.—From March 5th to May 5th varying numbers were on Whittle reservoirs, N., as many as 21 were present on March 11th. A number, up to 11, visited Newton Hall lake, N., during the same period (H.T.).

Smew.—From February 3rd to March 3rd there were from one to three on Whittle reservoirs, N., usually immature drakes or ducks, but on February 24th, 25th, and 27th a mature drake was present. Mature drakes are rare in N. and D. (H.T.). During March and April many Smews were seen off the coast near Beadnell, N., the largest flock numbering 17 on April 4th ; the last seen were on April 29th (S.A.). One duck or immature drake at Coltcrag, December 29th (H.T.).

Great Crested Grebe.—Did not breed at either of its known haunts this year. Single birds were noted on inland waters during the winter (H.T.).

Slavonian Grebe.—A large flock on the coast near Beadnell, N., increased from 10 on April 5th to 40 on April 19th (S.A.).

Red-necked Grebe.—Near Beadnell single birds were seen, dead or alive, on April 5th, 17th, and 21st (S.A.).

Black-necked Grebe.—April 29th, one seen at Beadnell (S.A.).

Lapwing.—In spite of the very late spring, young birds in down were noted in Weardale, D., as early as April 28th (J.G.).

Ruff.—At Whittle reservoirs on September 23rd, four birds ; September 28th, three birds, one being a cock (H.T.).

Knot.—At Whittle reservoirs on August 19th, one in grey plumage (H.T.).

Common Sandpiper.—First seen April 11th at Catcleugh reservoir, N., an early date (R.C.).

Green Sandpiper.—On August 11th, one at Whittle reservoirs, N. (H.T.).

Greenshank.—On April 14th, one at the Long Nanny, Beadnell, N. (S.A.).

Avocet.—On February 25th Mr. S. Ash twice saw two birds in flight near Beadnell which he feels sure were of this species.

Whimbrel.—On May 18th, two at Whittle reservoirs (H.T.).

Glaucous Gull.—On January 31st one found dead at Beadnell and on February 6th and 11th one seen at the same place, all immature (S.A.).

Pomatorhine Skua.—On January 10th and on March 1st single specimens were seen near South Shields, D., by Dr. H. M. S. Blair. The first was three miles inland. On October 26th a male, in first winter plumage, was found exhausted and dying on Holy Island, N., by Mr. Richard Perry and sent to the Hancock Museum.

Little Auk.—(See note in introduction above.)

Corncrake.—More numerous and widely distributed in Weardale, D., from Bishop Auckland to Stanhope, than for the last ten years at least (J.G.). Quite common on Alnwick Moor, N. (altitude 300 to 500 ft.), where there are many small holdings on which the cutting of hay is left until rather late in the season. During the last three summers at least eight or ten separate birds have been heard each season (J.E.R.). Near Langley, East Allendale, N., a single bird was heard for the first time for many years (W. Carter). One was heard for the first time for some years near Gibside, D. (S.E.C.). None heard near Warkworth this season (E.M.). None heard near Beadnell this year (S:A.).

Coot.—A juvenile female with abnormal toes hatched about May 20th at Newton Hall, Stocksfield, was found dead on July 23rd. Lobes were present on one side of the second toe only of each foot, instead of on both sides of all the toes (H.T.). This bird is now set up in the Hancock Museum.

Quail.—On June 9th one was heard near Stocksfield. As it was only heard on this one gccasion it was presumed that it had not bred (C. Richardson per H.T.).

Key to the initials occurring in the above Report : Sidney Ash, Dr. H. M. S. Blair, Dr. H. O. Bull, R. Craigs, S. E. Cook, J. Greenwell, E. Miller, Dr. F. J. Nattrass, B. M. Oliver, Mrs. C. Potter, J. E. Ruxton, H. Tully, G. W. Temperley, W. A. Wright.

THE GERMINATION OF SEEDS

ROBERT J. FLINTOFF

I READ the interesting article, ' Notes on Seeds and Seedling Plants ' (*The Naturalist*, May, 1941), by my friend, W. E. L. Wattam, with pleasure, more particularly because I am interested in this subject and am at present studying experiments I have made on the germination of the seeds of some monstrous forms of plants. I have no desire to presume to offer any criticism of the article generally, but I should like to make a few remarks on the first section—on the seeds of *Lupinus polyphyllus*—and in order that Mr. Wattam's data may be appreciated better, I give it in the form of a table, thus :

Seeds produced in	Planted	No. of Seeds	Yielded	Percentage	Average
1936	April, 1937	50	20 plants	40	51
	,, 1938	160	99 ,,	62	
1937	,, 1938	50	17 ,,	34	51
	,, 1939	100	68 ,,	68	
1936 1937	,, 1940	52	38 ,,	73	

The percentage column is my introduction.

Mr. Wattam uses the verb ' planted,' so I have followed him in this regard, although I prefer sowed in relation to seeds.

Now I think a moment's reflection will show that these data are not strictly comparative. They certainly indicate that the seeds of this plant when kept a few years germinate better than those sowed earlier. Candidly, I am not quite convinced that this is so. It may be, but the data I should like to have are shown in the following table :

Seeds Gathered in	Sowed	Number of Seeds Sowed	Seedlings Yielded
1936	August or September, 1936	100	X plants
,,	April, 1937	,,	,,
,,	,, 1938	,,	,,
,,	,, 1939	,,	,,
,,	,, 1940	,,	,,

The seed gathered in any year should be quite ripe, well mixed, and then sowed in boxes in a cold greenhouse in

similar soil year after year ; in fact, all the conditions for germination should be made as constant as possible, then the results of such experiments are truly comparable.

We have in this garden a large number of Lupins grown from our own seed which we gather when ripe and sow immediately in boxes. If the seed be gathered before it is really ripe it germinates badly.

I think Mr. Wattam would undertake an important research if he would try to find the effect of other factors in the germination of these seeds. For instance, what would happen from sowing seeds of different degrees of ripeness ; in different kinds of soil ; gathered from plants giving different colours of their flowers ; and of other differences which may occur to him. Personally, I am of opinion—but, of course, others may reasonably differ from me—that the exhaustive study of the germinating qualities of the seeds of one plant only is more likely to give informing data than the more or less haphazard experiments with a number of plants. I thank Mr. Wattam for the pleasure I have derived from studying his article, and the interest it has afforded me. I hope Mr. Wattam will continue his work on germination and arrive at important conclusions.

RECORDS OF SOME YORKSHIRE DOLERINE SAWFLIES (HYMENOPTERA)

W. D. HINCKS, M.P.S., F.R.E.S.

It was intended to follow a paper on the *Tenthredininæ* of the Leeds district (Hincks, 1937) with a second part giving the collected records of the *Dolerinæ*, but it soon became evident that many of the older records could not be accepted without critical revision. As the revision of the British species of this difficult group has yet to be published, it seemed better to postpone the list until Mr. R. B. Benson's work was completed.

In the meantime, when presenting a number of Sawflies and other Hymenoptera to the British Museum, I asked Mr. Benson to give me a list of the Dolerines contained therein. This I received some time ago and my thanks are due to Mr. Benson for the trouble taken in working out our material, and to him I owe anything of value in the following list.

I am deeply indebted to Mr. John Wood, of Keighley (J.W.) for most of the material, to which is added useful specimens taken by Messrs. Barnes (M.D.B.), Dibb (J.R.D.), and myself (W.D.H.).

Three species marked are new to the county, one of which (*D. bimaculatus* Geoffr.) is recorded from England for the first

time. I have appended notes on the interesting species taken from Mr. Benson's letter to me (22/8/1940).

There are keys to *Dolerus* by Morice (1910) and Perkins (1930), but neither are entirely satisfactory, and the publication of Mr. Benson's revision is eagerly awaited, but will no doubt be delayed until more favourable times.

Family : TENTHREDINIDÆ
Sub-family : DOLERINÆ

Loderus vestigialis Kl.
Keighley, Marley : 7/8/37, 2♂ (J.W.) ; Holmehouse Wood : 15/6/35, 2♀, 20/6/35, 1♂ (J.W.).
Shipley Glen : 16/6/34, 1♀, 25/5/35, 1♀ (J.W.).
Bolton Woods : 6/6/36, 1♀ (J.W.).
York, R. Foss : 10/6/33, 1♀ (J.R.D.).
Askham Bog : 21/5/34, 3♂ (J.W.).
Skipwith Common : 5/6/37, 1♀ (W.D.H.).

Loderus palmatus Kl.
Keighley, Holmehouse Wood : 2/6/34, 1♂ (J.W.).

Dolerus gonager Kl.
Keighley, Holmehouse Wood : 25/5/34, 1♂, 27/4/35, 1♂, 16/5/36, 1♂1♀, 11/6/36, 1♀, 10/4/38, 2♂ (J.W.) ; Riverside, Utley : 24/4/37, 2♂, 15/5/37, 1♂ (J.W.) ; Newsholme Dene : 1/5/37, 1♂ (J.W.) ; Harden Moor : 17/5/37, 1♀ (J.W.).
Bolton Woods : 22/4/35, 1♂, 29/6/35, 1♀ (J.W.).
Shipley Glen : 13/5/33, 2♀, 26/5/34, 1♂, 16/5/35, 1♀, 16/5/37, 1♀ (J.W.).
Pool-in-Wharfedale : 6/37, 3♀ (W.D.H.).
Allerthorpe Common : 1/6/36, 1♂ (J.W.).
Skipwith Common : 5/37 (W.D.H.).

**D. saxatilis scoticus* Cameron. (Note 1).
Keighley, Harden Moor : 10/5/34, 1♂ (J.W.).

**D. gessneri* André (Note 2).
N. Yorks., Kilburn : 26/5/35, 1♂ (M.D.B.).

**D. bimaculatus* Geoffroy (Note 3).
Skipwith Common : 5/6/37, 1♂1♀ (W.D.H.).

D. madidus Kl.
Keighley, Harden Moor : 21/4/34, 1♂ (J.W.).
Shipley Glen : 21/5/34, 1♂ (J.W.).

D. æriceps Thoms.
Keighley, Holmehouse Wood : 15/6/35, 1♀, 28/6/35, 1♀, 6/7/35, 1♀, 13/7/37, 1♀ (J.W.) ; Marley : 9/7/36, 1♀, 16/7/36, 1♀ (J.W.).
N. Yorks., Wass : 2/8/34, 1♂ (M.D.B.).

D. germanicus var. *arcticus* Thoms.
Keighley, Holmehouse Wood : 3/8/34, 1♀ (J.W.).
Askham Bog : 21/5/34, 3♂ (J.W.).

D hæmatodes Schrank.
Keighley, 26/4/35, 1♀ (J.W.).
Kildwick : 15/5/37, 1♀ (J.W.).

D. anthracinus Kl. (Note 4).
Keighley, Holmehouse Wood : 31/3/34, 1♂1♀, 13/4/34, 1♂, 14/4/34, 3♂, 24/3/35, 1♂, 15/4/35, 2♂, 12/4/39, 1♂ (J.W.) ; Lower Shann Lane : 13/3/38, 1♂ (J.W.).

D. asper Zadd. (*oblongus* Cameron).
Askham Bog : 21/5/34, 2♂1♀ (J.W.).
Bubwith : 26/6/37, 1♀ (J.W.).

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Dolerus possilensis Cameron.
Bolton Woods : 22/4/35, 1♀ (J.W.).

D. picipes Kl.
Shipley Glen : 5/5/34, 1♂ (J.W.).
Allerthorpe Common : 1/6/36, 1♀ (J.W.).

D. nigratus Muller (Note 5).
Skipwith Common : 5/6/37, 1♂ (W.D.H.).

D. niger L.
Keighley, Holmehouse Wood : 2/6/34, 1♂ (J.W.).

D. rugosulus D.T.
Keighley, Holmehouse Wood : 17/4/34, 1♂, 13/6/35, 1♀ (J.W.) ;
Riverside, Utley : 24/4/37, 1♀ (J.W.).
Kildwick : 16/5/36, 1♀ (J.W.).
York District : 16/6/35, 1♂ (M.D.B.).

D. æneus Htg. (Note 6).
Keighley District : 13♂8♀ (J.W.).
Ripon, Skell Valley : 23/6/34, 2♀ (W.D.H.).
Skipwith Common : 5/6/37, 1♀ (W.D.H.).

Notes

(1) ' *D. saxatilis scoticus* Cameron is a new Yorkshire record although I recorded it in Durham (Teesdale) in 1940 ' (Benson *in litt.*, *vide* Benson, 1940).

(2) ' *D. gessneri* I got at Allenhead, Northumberland, last year and J. F. Perkins took it in the Forest of Dean, Gloucestershire ; apart from these it was only previously known in Ireland and Scotland ' (Benson *in litt.*).

(3) ' *D. bimaculatus* Geoffr. is a grand find which considerably extends the known range of this species in Britain (Spey Valley, Inverness ; Dublin and Wicklow in Ireland) and is the first English record. (Benson *in litt.*).

(4) ' Actually the set of *D. anthracinus* was very welcome ; though it is probably widely distributed in this country and even common locally it is not often met with as it flies so early in the season, March-April ' (Benson *in. litt.*). We have taken this species every year in some numbers in various localities in the Leeds district, sometimes in March and in some seasons not until April.

(5) A non-Yorkshire record in Mr. Benson's list may be mentioned : Cambs., Wicken Fen : 28/6/36, 1♀ (J.W.).

(6) The following is a Cumberland record : Braithwaite : 6/33, 2♀ (Mrs. M. Murray).

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THE YORKSHIRE NATURALISTS' UNION AT INGLETON

THE second meeting in 1941 was held during the Whitsuntide week-end, May 31st to June 1st, and again weather conditions were favourable. With all spare beds in Ingleton filled with evacuees it was rather difficult to find accommodation for the 36 members and associates who took advantage of the short holiday, and with others coming in for single days the attendance was much larger than might have been expected under present conditions. No excursions were arranged in advance so that a fine day might be devoted to climbing Ingleborough. The ornithologists devoted Saturday to the Ingleborough area, Sunday to Kingsdale and Whernside, and Monday to the two ghylls. The geologists visited many well-known exposures, and the remainder of the members had Saturday in Thornton Ghyll, Sunday on Ingleborough, and Monday in Beezley Ghyll.

Butterflies were few and included the Green Veined White, Small Tortoiseshell, and a single and much worn Peacock, on a visit to Keasden later in the week a pair of the Green Hairstreak were seen. Among the two winged flies *Bibio leucopteris* Mg. was plentiful in places, and the black females contrasted strangely with the white winged males. Two other species were seen, *B. marci* L. and *B. reticulatus* Lw. On the cottongrass areas on the hills *Tipula subnodicornis* Ztt. was plentiful, as was *T. hortulana* Mg. in the woodlands. Two specimens of *T. macrocera* Ztt. were caught higher up Ingleborough. Others taken were *T. montium* Egg., *T. lateralis* Mg., and *T. variicornis* Schum. Perhaps the best capture was a single *T. truncorum* Mg. in Beezley Ghyll.

The large and finely marked *Pedicia rivosa* L. was found on a boggy spot, and several specimens of *Dactylolabis sexmaculata* Mcq. (*frauenfeldti* Egg.) were caught with wings much more strongly marked than is usual with specimens found in the crevices of the limestone pavement. Other limnobids caught were *Ptychoptera albimana* F., *Limnobia nubeculosa* Mg., *Dicranomyia autumnalis* Staeg., *Lipsothrix remota* Walk. and *Trichocera hiemalis* Deg.

A few fungus gnats included *Mycomyia ornata* Mg., *Mycetophila cingulum* Mg., *Boletophila cinerea* Mg., *Gymnochæta viridis* Fal., *Pipunculus campestris* Ltr., *Platychirus albimanus* F., *Chilosia variabilis* Pz., *C. vernalis* Fln., *C. maculata* Fln., and *Empis trigramma* complete the list from Ingleton. From Keasden came the uncommon *Triogma trisulcata* Schum.

Ornithology.—Mr. Ralph Chislett writes: The ornithological party passed two days on the hills (Ingleborough and Whernside), and one day in the Ingleton glens 52 species were identified.

The most ubiquitous species on Ingleborough and Whernside were the Wheatear (nest with six eggs seen under a rock) and Meadow Pipit, of which four nests were seen. At any time during the climb from the roadsides almost to the summit were these two species in evidence, the Wheatear being usually in the vicinity of rocks. The few Redshanks and Snipe were soon left behind in the streamside pastures; and with the passing of the limestone outcrop bounding the upland pastures most of the numerous Lapwings were lost. As the ground began to take on the characteristics of moorland, Golden Plovers and Curlews became audible but were not numerous. On Ingleborough the Ring-ousel appears to be mainly a bird of any of the escarpments above the altitude (say) of 1,000 feet. On Whernside we saw no Ring-ousels, but a tarn was tenanted by some 80 pairs of breeding Black-headed Gulls; and on the higher ground a Dunlin first walked, then flew, and trilled before W. K Mattinson. On another tarn swam three Lesser Black-backed Gulls; and one bird of this species had sufficient interest in the area to attempt

to drive away a Common Buzzard, the turns and twists in the air of the two birds being watched by all of us. Ravens were seen and heard above both hills. Several Mallard were seen on the Whernside pools. Grouse were very scarce in both areas ; and Cuckoos were not common.

After two days in the hills it was rather refreshing to find so many small birds in the two wooded glens. Several Wrens sang lustily ; and the species heard or seen included Tree-pipit, Pied and Grey Wagtails, Blue, Great and Cole Tits, Spotted Flycatcher, Wood, Willow, Garden, and Blackcap Warblers, and Dipper and Redstart of both of which nests were seen. All these birds were in full song, as well as several commoner species. From its nest inside a stump a Redstart returned the close gaze of several members with interest, and declined to budge. Young Tawny Owls watched us pass.

Having been informed by W. K. Mattinson that a Corncrake might be heard in the fields below the bridge carrying the main road, I was able to hear the bird for the first time for several years. The same area yielded additions to the list of birds identified with Yellow Wagtail, Common Whitethroat, and Sandpiper. Swifts were numerous, and it was pleasant to see so many House Martins, with a few Sand Martins and Swallows.

Flowering Plants (W. A. Sledge) : Few areas in the county are better known botanically than the Ingleton district. The richness of the flora and beauty of the surroundings have combined to attract successive generations of botanists whose assiduous explorations of the flora leave little scope for discovery to the present day visitor. The Ingleton glens still harbour most (and probably all save *Cypripedium* and *Cephalanthera ensifolia*) of their rarer recorded species, and the Dutch Rush (*Equisetum hyemale*) was seen in the locality where it has been known for over a century and a half. Lily of the valley was only in bud, and spring flowers with bluebell, primrose and violets as the most conspicuous were still in full bloom. The following species were among those listed ;

Ranunculus auricomus L.
Cochlearia alpina Wats.
Viola lutea Huds.
Euonymus europæus L.
Prunus Padus L.
Rubus saxatilis L.
Alchemilla pratensis Schmidt.
Sedum Telephium L. em Gren. & Godr.
Galium pumilum Murray.
Asperula odorata L.
Crepis paludosa (L.) Moench.
Primula veris × *vulgaris*.
Myosotis sylvatica (Ehrh.) Hoffm.
Lathræa squamaria L.
Populus tremula L. var. *villosa* Wesm.
Polygonatum officinale (L.) All.
Paris quadrifolia L.
Melica uniflora Retz.
M. nutans L.
Sesleria cærulea Ard.
Equisetum maximum Lam.
Asplenium viride L.
Cystopteris fragilis (L.) Bernh.
Ophioglossum vulgatum L.

It was too early to see more than a few of the alpines of the Ingleborough crags in flower. Species noted here included *Cochlearia alpina*, *Arenaria verna*, *Saxifraga hypnoides*, and *Sedum roseum*, while one or two late flowers of *Saxifraga oppositifolia* were found. On the rocky and peaty ground above the crags *Carex rigida* and *Lycopodium Selago* were seen and Cloudberry (*Rubus Chamaemorus*) was noted in several places both on Ingleborough and Whernside. The calcareous pastures and limestone pavements at the base of the mountain are more prolific at this season of the year and here *Actæa spicata*, *Cardamine impatiens*, *Primula farinosa*, and *Polypodium calcareum* were seen with *Sesleria cærulea* as the dominant grass over the whole area. *Thalictrum montanum* and *Lastræa rigida* were seen in crevices of the limestone pavement on the Twistleton scar area of Whernside.

A visit was made to Combe Scar, Whernside, in order to see the locality for *Silene maritina* rediscovered here a few years ago by our secretary. The dry gritty crags dominated by bilberry and *Deschampsia flexuosa* contrast strongly with the floristically rich and diversified limestone crags of Moughton which have long been regarded as the sole West Riding locality for the Sea Campion. The plant is certainly much more plentiful on Combe Scar and the abundance of seedlings indicates that it is increasing here. The Parsley fern (*Cryptogamma crispa*) is also very abundant on these scars.

Plant Galls (Fred B. Stubbs) : The galls found at Ingleton last week-end were very few.

ACARINA

Phyllocoptes acericola on *Acer pseudo-platanus*.
Eriophyes avellanæ on *Corylus avellana* (very few).

CYNIPIDÆ (Hymenoptera)

Biorrhiza pallida form *aptera* on *Quercus*.
Andricus noduli form *radicis* on *Quercus*.

CECIDOMYIDÆ (Diptera)

Oligotrophus taxi on *Taxus buccata* (very few).

Other insects found are not yet determined ; I have handed some to Maurice Barnes.

Conchology (E. M. Morehouse) : Once again the members of the Y.N.U. were favoured with perfect weather and beautiful country for the Whitsuntide meeting. No rain fell during the week-end, consequently molluscs were not in evidence ; they had to be searched for very carefully. However, the result was gratifying as the subsequent list will show.

Only two species previously recorded for the district in 1906 were not observed, but others can be added to the list ; whether these are new remains to be found out.

Jaminea cylindracea Da Costa was evenly distributed, *Pyramidula rupestris* Drap. was seen on the stone walls on the lower slopes of Ingleborough, and *Vitrea alliaria* Miller, *Cochlicopa lubrica* Müller, *Hygromia rufescens* Pennant seemed the dominant molluscs in both ghylls and just around them on the higher ground.

Limax maximus L.
Agriolimax agrestis L.
A. agrestis L. var. *reticulata* Moq.-Tan.
A. agrestis L. var. *obscura* Moq.
A. agrestis L. var. *pallida* Shrenk.
Arion ater var. *aterrima* Taylor.
A. ater var. *plumbea* Roebuck.
Vitrina pellucida Müller.
Vitrea cellaria Müller.
V. pura Alder.
V. crystallina Müller.
V. rogersi B. B. Woodward.
V. alliaria Miller.
V. nitidula Drap.
Hygromia rufescens Pennant.
H. hispida L.
Pyramidula rotundata Müller.
P. rupestris Drap.
Cochlicopa lubrica Müller.
C. lubrica Müller var. *lubricoides* Fér.
Azeca tridens Pulteney.
Jaminea secale Drap.
J. cylindracea Da Costa.
Clausilia bidentata Ström.
Helix nemoralis L.
Ariantá arbustorum L.
Balea perversa L.
Limnæa pereger Müller.
Succinea elegans Risso.
Ancylus fluviatilis Müller.
Limnæa truncatula Müller.

Fungi (W. G. Bramley) : Conditions were dry, and little of the larger fungi was seen or expected. The excursion over Ingleborough revealed very few species, but the ground was not such that would tempt a mycologist intent on serious work.

* Not recorded in *Catalogue of Yorkshire Fungi* for V.C. 64.
† Not recorded for Yorkshire in Catalogue.

MYXOMYCETES.

Reticularia lycoperdon Bull.
Lycogola epidendrum Fr.
Trichia affinis de Bary.
T. botrytis Pers.
Perichæna corticalis Rost.

ASCOMYCETES.

Onygena equina Willd., on old horn.
Morchella esculenta.
Dasyscypha virginea (Batsch) Fckl.
Trichoscypha calycina (Schum.) Bond.
Mollisia cinerea (Batsch) Fr.
Rhytissma acerinum (Pers.) Fr. (ascophores).
**Nectria punicea* (K. & S.) Fr.
Endodothella junci (Fr.) T. & S. (Ingleboro).
Nitschkia tristis Pers.
Leptosphæria acuta (M. & N.) Karst. (Ingleboro).
**Valsa* (*Eutypella*) *sorbi*, on Mountain Ash.
V. (*Cryptospæria*) *eunomia* Fckl., on Ash.
**Anthostoma decipiens* (D.C.) Nils., on Elm.
**Diaporthe leiphæmia* (Fr.) Sacc., on Oak.
Melanconis stilbostoma (Fr.) Tul., on Birch.
Diatrype stigma (Hoffm.) Fr.
Diatrypella quercina (Pers.) Nils., on Oak.
D. verruciformis (Ehr.) Nils., on Hazel and Birch.
Hypoxylon fuscum (Pers.) Fr., on Hazel.
H. multiforme Fr., on Birch.
H. rubiginosum (Pers.) Fr., on Ash.
Xylaria hypoxylon (Linn.) Fr. (ascophores).

BASIDIOMYCETES.

Melampsora rostrupii Wagner O.I., on *Mercurialis.*
Triphragmium ulmariæ Wint. II on *Spirea.*
Phragmidium fragariastri Schroet., on *Potentilla sterilis* Gar.
Uromyces valeriana (Schum.) Fckl. O.I. on *Valeriana dioica.*
U. ficariæ (Schum.) Lis., on *Ran. ficaria.*
U. scillarum (Grev.) Wint., on Bluebell.
U. poæ Rabesh. O.I. on *Ran. ficaria.*
Puccinia taraxici Plowr. II. on *T. officinale.*
P. major Dretel. O.I. on *Crepis paludosa.*
P. betonica D.C., on *Stachys betonica.*
P. tumida Grev., on Conopodium.
P. fusca Wint., on Anemone.
P. oblongata Wint. II., on *Luzula sylvatica.*
Galera tenera (Schæff.) Fr.
Pholiota præcox (Pers.) Fr.
Omphalia umbellifera (Linn.) Fr. (Ingleboro).
Stropharia semiglobata (Batsch.) Fr. (Ingleboro).
Polyporus betulinus (Bull) Fr.
Polystictus versicolor (Linn.) Fr.
Trametes mollis (Somm.) Fr.
Stereum hirsutum (Willd.) Fr.
†*Hymenochæte* (Pers.) Bres. [Though not in Catalogue. I have records for V.C. 62 and 64]. On Hazel.
Peniophora setigera (Fr.) Bres. (Ingleboro).

FUNGI IMPERFECTI.

**Darluca filum* (Broon.) Casl., parasitic on *Puccinia oblongata.*
Tilachlidium tomentosum (Schrad.), Lind., on *Trichia affinis.*

YORKSHIRE NATURALISTS' UNION AT ABERFORD

The third meeting of the year was fixed for Tanfield, but it was found impossible to arrange for catering there and as a day excursion further up the dale proved a failure last year, it was arranged for us to meet at Aberford, visit Hayton and Hazel Wood, and have the tea and meeting at Aberford. The result was another successful meeting, due in some measure to the attendance of the members of the Leeds Geological Society and the Leeds Co-operative Naturalists, at least 40 members and associates being present. The Entomologists will give their report as a separate paper.

Flowering Plants (W. A. Sledge) : The hedge banks in the lane leading to Hayton Wood yield, in addition to the more widespread species of the magnesium limestone, *Hypericum montanum*, *Geranium pyrenaicum*, and *Atropa Belladonna*. *Bromus erectus* was much in evidence on the dry banks where *Brachypodium pinnatum* is equally noticeable at a later date. In Hayton Wood *Actæa spicata* was seen in one of its few stations on the Permian tract. *Convallaria* and *Paris quadrifolia* are both common species in this wood and on the eastern borders more *Atropa Belladonna* was seen. Other species noted were mostly plants which are frequent or common on the Permian limestone : they included *Viola hirta*, *Hypericum hirsutum*, *H. perforatum*, *Bryonia dioica*, *Galium Mollugo*, *Cornus sanguinea*, *Viburnum Opulus* and *Lithospermum officinale*. No species were noted in Hazel Wood which had not been observed earlier in the excursion.

Ecology (A. Malins Smith) : Hayton Wood showed a very varied ground vegetation, corresponding to local variations of soil. On the western side the soil was a stiff clay, basic in reaction, and apparently often lying very wet. Toward the eastern side the soil was lighter, often with a good deal of humus and acid in reaction. The former soil grew a ground vegetation of Dog's Mercury, Hairy Violet, Strawberry, Sanicle, and Harry St. John's Wort with localities where Lilly-of-the-Valley was common and Herb Paris and Baneberry occasionally found. In these localities the most basic soil reaction was observed. Garlic was also common in the wetter parts on this side. On the eastern side the well-known Bracken-Bluebell association was present with plenty of Wood Anemone. It was interesting to learn afterwards from our President that the western side of the wood was on the massive Permian limestone, while further to the east the limestone was only in thin bands which were often interrupted or absent. Thus the distribution of ground vegetation corresponded well with the underlying geology. Naturally there was no sharp dividing line between the two regions, but Dog's Mercury, Bracken, Sanicle, Bluebell, or Garlic prevailed according to slight differences of level and variations of local soil conditions. Nevertheless it was interesting to observe that the soil reaction always corresponded to the ground vegetation, being most basic among Dog's Mercury, Paris, and Lily-of-the-Valley, somewhat acid among Bluebell and Anemone and most acid among Bracken. The tree canopy was mixed, but corresponded to Ash wood on the west and Oak-birch on the east with local variations. The presence of considerable amounts of birch even in the Ash wood was an unusual feature, not often found on such a basic soil. The mixture in some places of features usually separately found in Ash wood and Oak-birch wood respectively was well illustrated by the vegetation of an area where Bracken grew in peaty humus with a *p*H of 5.5 (approx.). While the tree canopy above was ash and birch and the other chief components of the ground vegetation were small plants of Dog's Mercury and some Sanicle.

Hazel Wood was entirely on the massive limestone and resembled the western side of Hayton Wood, showing in the main Ash above,

Dogwood, Maple, and Spindle in the shrub layer, and Dog's Mercury and Sanicle in the ground vegetation. Here again, however, birch was commoner than is usually found on such soils and oak was fairly frequent also. If it is true, as seems likely, that these woods are in part untouched remnants of the old Forest of Elmet, then it has probably been difficulties of drainage which have prevented them from being absorbed for arable cultivation on this usually very fertile Permian soil. In most parts there were evidences of the soil lying very wet in winter and such a stiff clay if often wet, would be very difficult to work.

Regeneration of the woodland was going on, tree seedlings being frequent, especially ash and hawthorn, and in one place a progressive hawthorn scrub on basic soil would probably culminate in ash wood. On this area no young birch was found.

Fungi (W. G. Bramley) : Once again the ground traversed was dry, and little in the way of the larger fungi were to be found. One result of the dry spell was evidenced by the Creeping Thistle attacked by *Puccinia obtegens*. They were all drooping while the healthy plants were standing erect, a very convincing example of the effects of parasitism. One or two specimens are held over for further examination.

MYXOMYCETES

Lycogola epidendrum Fr.

PHYCOMYCETES

Plasmopara pusilla (de Bary) Schroet. On *G. pratense*.
Peronospora grisea Unger. On *Veronica beccabunga*.
P. schleideni Unger. On *Allium*.

ASCOMYCETES

Dasyscypha virginea (Batsch) Fckl.
Trichoscypha calycina (Schum.) Bond.
Rhytisma acerinum (Pers.) Fr. (ascophores).
Leptospora ovina (Pers.) Fckl.
Leptosphæria acuta (M. & N.) Karst. On old Nettle stems.
Valsa curreyi Nils. On Larix. (Not listed in Catalogue of Yorkshire Fungi, but is not uncommon especially in pycnidial stage.)
Diaporthe leiphæmia (Fr.) Sacc. On Oak.
Melanconis stilbostoma (Fr.) Tul. On Birch.
Diatrype stigma (Hoffm.) Fr.
Anthostoma decipiens (DC) Nils. On Elm.
Diatrypella verruciformis (Ehr.) Nils. On Birch.
Daldinia concentrica (Bolt.) Ces. & de Not.
Hypoxylon multiforme Fr. On Birch.

BASIDIOMYCETES

Puccinia obtegens Tul. O.II. On *C. arvense*.
Psathyrella disseminata (Pers.) Fr.
Polyporus betulinus (Bull.) Fr.

The Entomologist's Monthly Magazine for June contains 'Larvæ of British Beetles : II, A key to the British lamellicorn larvæ (with plates),' by F. I. van Emden ; 'Notes on Earwigs in Northern Scotland,' by G. D. Morison ; 'Distribution of *Eristalis abusivus* Collin (Dipt. Syrphidæ) in the British Isles, with notes on the Female,' by R. L. Coe ; 'A Key to the British Species of *Holoparamecus* Curtis (Col. Lethrisiidæ),' by H. E. Hinton ; '*Apion armatum* Gerst. (Col. Curculionidæ) new to Britain in the New Forest,' by C. Morley ; 'Notes on the Odonata and Neuroptera of Norfolk Island,' by D. E. Kimmins ; 'Experiments on Living Pupæ (Lep.),' by G. S. Kloet, and 'The British Species of the Dolichopodia genus *Medeterus* Fisch (Dipt.),' by J. E. Collin.

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The NATURALIST

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NATIONAL MUSEUM

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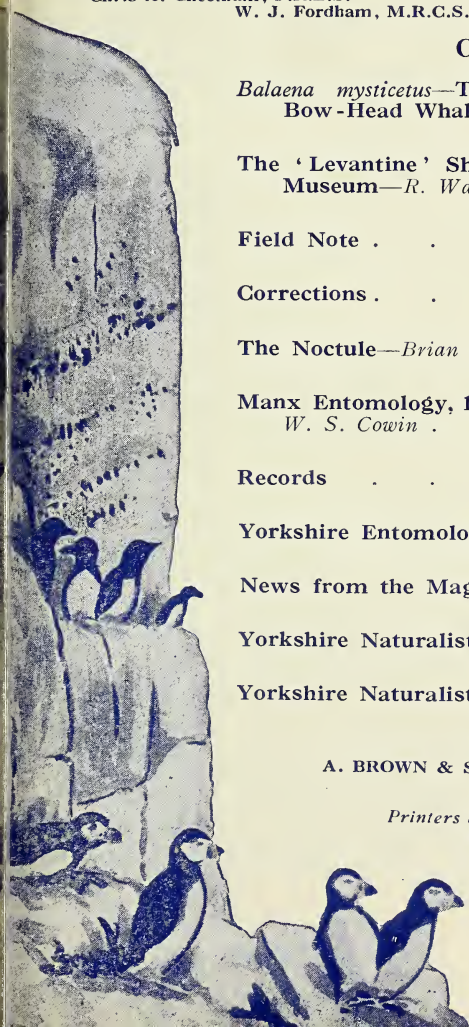

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YORKSHIRE NATURALISTS' UNION

BOTANICAL SECTION

THIS Section will meet in the Botany Common Room, Leeds University (Botanical Department, Beech Grove Terrace) on Saturday, October 11th, at 3 p.m.

Business: Nomination of Officers and Committees and consideration of the Annual Report.

CHRIS. A. CHEETHAM.

Section B—VERTEBATE ZOOLOGY

President—E. WILFRED TAYLOR

MEETINGS will be held on Saturday, 18th October, 1941 in the GENERAL LECTURE ROOM, LEEDS UNIVERSITY as under:

1-45 p.m.—Mammals, Reptiles, Amphibians and Fishes Committee.
2-30 p.m.—Committee for Ornithology.
3-15 p.m.—Vertebrate Zoology Section: General Meeting.

Members, Associates and Friends are invited.

18 Queen Square,
Leeds, 2.

REX PROCTER,
Hon. Sec.

ENTOMOLOGICAL SECTION

THE Annual Meeting of the above section will be held during the afternoon of Saturday, October 25th, in the Hook Room at the Church Institute, Albion Place, Leeds, commence 2-30 p.m. Will any member with interesting records please send them as soon as possible to the Secretary.

12 Dudley Road,
Marsh, Huddersfield.

M. D. BARNES,
Hon. Sec.

YORKSHIRE LEPIDOPTERA RECORDS FOR 1940-41

WILL all members who have items to record in connection with above please send all particulars at once to E. DEARING, 17 Bayfield Road, Liverpool, 19.

BALAENA MYSTICETUS—THE GREENLAND, ARCTIC OR BOW-HEAD WHALE

R. W. GRAY

(*Additional Notes*)

In my last paper on this whale in *The Naturalist* I find that I might well have said more about the animal's migrations especially as they are by no means well understood.

In the spring and summer the Greenland whales divide into three groups, each of which has to be considered by itself.

1. The Breeding Females

Open Seasons.—In these seasons the breeding females were seen in the spring in open water or among ' bay ' (*i.e.* thin recently formed ice) in the vicinity of Hakluyt's Headland at what Scoresby calls the ' fishery of April in the latitude of 80'. The animals seem to pass the winter in this situation and to bring forth their young in March or April. The Senior Scoresby frequently mentions mothers and calves, and he mentions capturing one of the former in the end of April, 1794. About the end of the month the whales disappeared, doubtless entering the ice. According to the Junior Scoresby, in the autumn they reappeared, and the fishing was renewed by the Dutch ' at the verge of the most northern waters, near Hakluyt's Headland,' but of this there seems to be considerable doubt. My father never went north soon enough or far enough towards the North-east to see these whales ; consequently we find him saying 'After forty years' whaling experience in the Greenland Seas I have not seen more than a dozen old whales accompanied by calves altogether.'

Close Seasons.—In these seasons the gap between the Greenland Sea ice and the ' S-E Ice ' (*i.e.* the ice that issues from the Barents Sea) is closed by a barrier consisting partly or entirely of ' bay ' or light ice situated in lat. 76°, termed a ' S-E Pack.'

In these seasons the breeding females were found in the spring in open water or among ' bay ice ' in latitude 75° or 76° (according to the position of the barrier) at what Scoresby calls ' the fishery of Latitude 76.' The animals probably pass the winter in this latitude, bringing forth their young in March or April. Ships which arrived soon enough must have frequently seen mothers and calves and attacked them. According to the Junior Scoresby, in the end of April, 1811,[1] a Hull whaler killed a ' sucker ' *which had the funis umbilicalis still attached.* As soon as the ice permitted the mothers and

[1] 1811 was a close season consequently the ' sucker ' must have been caught at the latitude 76° fishing.

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their calves migrated farther north and were only halted when they came to the North or Whaling Ice. The Senior Scoresby saw a number in 1798, his men killing a calf on May 27th small enough to be hoisted on deck. In June, 1811, the Junior Scoresby caught one in latitude 78° 45′.[1]

One of the summer resorts of the mothers and calves probably were the waters adjacent to North-east Greenland, and in that situation they were perhaps at one time attacked by the now extinct Eskimos. They were sometimes seen in lower latitudes off the same coast. Scoresby Senior mentions in his log-books seeing one or two mothers and calves in the vicinity of the great inlet which bears his name, and in July, 1885, we saw a mother and calf among the ice in latitude 74°.

2. The Small and Half-grown Whales[2]

Open Seasons.—These whales were seen among the north or whaling ice in intermediate latitudes[3] at what we called ' The North Fishing.' The smallest whales were seen farthest north and nearest the unbroken ice ; the largest ones farthest south but seldom as far south as 77½ N. 5 W. As my father says : ' 77° (? 77½°) to 78° 40′ yields " second sized whales," averaging ten or twelve tons of oil each ; 79° to 80° 20′ " nursery whales." ' According to what my father used to say, this section of the whales passes the winter in a low latitude among the ice, migrating northwards in the spring but seldom showing themselves in the outskirts of the ice until north of latitude 78°. He says they reached 73° in the beginning of April, 75° about the end of the same month and 78° about the middle of May. The small whales were generally in the van, the larger ones lagging behind. Few whales were seen at this fishing in very open seasons, the animals preferring situations farther north. In 1886, about the end of May, we saw a number in 79° 50′ N., 2 E. ; they were near the unbroken ice, in a bight, on the north side of a point. We got seven and my uncle A's ship a like number —the fourteen only yielded about 80 tons.[4]

Close Seasons.—In these seasons the whales were usually caught in about 78½° ; they were later in appearing but were later in disappearing into the ice. In 1866 my father did not

[1] In 1798 Scoresby reached latitude 79 about the middle of May and had to wait until the whales appeared. *The mothers and calves were the first to do so.*

[2] The capture of these whales explains the low average oil-yield of the Greenland Sea whales; at Davis Straits where, prior to the extension of the fishing to Baffin's Bay, this section of the whales escaped the average was much higher. C. F. Scoresby, Jr., l.c. Vol. 11, p. 392.

[3] Termed by Scoresby Junior ' The regions of 78.'

[4] In June, when the ice opened, the whales disappeared into it, and the fishing was over for a year.

see one until May 24th ; and in 1881 the *Hope* not until June 7th. Many small whales were caught by the ships which succeeded in getting far enough north in time ; in 1807 the *Enterprise* of Peterhead caught thirty-four, which only yielded 172 (old) tons[1] and in 1838 my grandfather caught twenty-two, which only yielded about 100 tons. At one time mothers and calves were a not infrequent sight, and I have already given two instances.

We have very good reasons for believing that the waters adjacent to North-east Greenland in latitude 77° were an important summer resort of the small whales and that at one time the Eskimos attacked them. They were sometimes seen farther south at the same season off the same coast. In 1822 Scoresby Junior caught a very small one in latitude 72° and in 1884 the *Erik* caught one with whalebone only 4½ feet in length.

3. The Old Males and Resting Females[2]

If I am right, in both open and close seasons, the latitude 76° waters were also the winter and spring resort of the old males and resting females. At any rate, there can be no doubt but that these waters were at one time frequented by numbers of large whales. Scoresby says : ' Though the 79th degree affords whales in the greatest abundance, yet the 76th degree affords them, perhaps, more generally. In this latter situation, a very large kind of mysticetus is commonly to be found throughout the season from April to July inclusive.'

After Scoresby's time the sight of a whale in latitude 76 became a rare and eventually an almost unknown sight. My father, for instance, never caught a whale in latitude 76°, and although we were often in that latitude we never saw more than a few narwhals. Why was this ? Possibly because whales of the largest size became scarce and because the ' food ' or plankton was beyond the reach of the smaller ones.

I may appear to have identified the latitude 76° whales with the old males and resting females on insufficient evidence, but what other could they have been ?

In 1875 my father caught a whale in latitude 77° which answered to the description Scoresby gives ; it was a large animal with ' bone ' fully 12 feet in length.

The waters adjacent to East Greenland, between 70° N. and 75½° N., are the summer resort of the old males and resting females, but only when there is plenty of ice. There can be no doubt about the size of the whales which were caught in these waters ; three caught by Scoresby in 1822, on

[1] Of 17½ cwts.

[2] Resting females, *i.e.* females not going to produce until the following spring.

the same date, yielded 60 (old) tons ; eight caught by my father in 1863 yielded 150 tons, and twelve caught by him in 1872 yielded nearly 200 tons. As to the sex the majority seem to have been males ; the three of Scoresby's just referred to and another caught by his father were all males. According to my father the males exceed the females by twelve to one, and of six we caught in 1885 only one was a female.[1]

THE 'LEVANTINE' SHEARWATER IN THE YORKSHIRE MUSEUM

R. WAGSTAFFE

Since P. R. Lowe separated the Shearwater of the Western Mediterranean from the typical *Puffinus puffinus yelkouan* (Acerbi) of the Eastern Mediterranean under his name of *mauretanicus*, the examination of a number of British taken 'Levantine' Shearwaters in the light of Lowe's separation has shown that all so far examined are referable to *mauretanicus* and that *P. p. yelkouan* has yet to be established as a British bird. In further confirmation of this it may be of interest to record that I recently examined the 'Levantine' Shearwater in the Yorkshire Museum taken at Flamborough, Yorkshire, August 16th, 1890, and have no hesitation in stating that it is a typical example of *mauretanicus*, although perhaps slightly faded on the upper parts.

FIELD NOTE

Unusual food of an Insectivorous Bird.—I watched a Willow Warbler in my garden at York on July 26th feeding a fully-fledged member of its family with portions of ripe raspberry. I was within ten feet of these birds for about fifteen minutes ; during this time the parent pecked pieces from the rasps quite close to me, and the young bird accepted them with every apparent relish. I could not find the least trace of insect life on the pecked berries, and I am confident that it was fruit only that was being eaten. In fact, it was the red object in the Warbler's beak that drew my attention.—Sydney H. Smith, J.P., F.Z.S.

CORRECTIONS

Page 226—Line 11 *read* Boud *not* Bond. ; Lines 20, 24, 25 *read* Nits, *not* Nils. ; Line 37 *read* Rabenh *not* Rabesh. ; Line 39 *read* Dietel *not* Dretel. ; 6 lines from bottom add after *Hymenochæte* Cinnamomea ; 2 lines from bottom *read* (Broom) Cast. Page 228—in each case *read* Nits. *not* Nils.

[1] The sex of a whale becomes very apparent when it is being flensed.

THE NOCTULE

(*Continued from page* 198)

Second Year.—On October 20th the shed was deserted. On the 24th—the next day on which I was able to visit it—it contained eleven males, all ringed except one ; so that there had been an addition of one male from some outside source and the summer had passed without fatality. The newcomer was marked immediately with a white ring. When I first entered the shed the bats, again hanging in a row bunched closely together, but not overlapping, and the black male in the same position, third from the right as in the previous year, were immediately aware of my presence. Again there was the slight shivering of the wings and the very slight—or was this pure imagination?—shifting of the feet. Again, as the winter progressed, there was no sign that they were aware of my presence, and, as in the previous winter, mild days brought no answering movement in the colony. There was no movement at all until March 12th when two individuals had their heads showing. On the 13th the number then showing signs of life was six : on the 15th six left the shed at 6-4. The shed was used again on the 16th. On the 17th four left the shed and did not return. Examinaton showed the remaining seven to be dead. Two had, therefore, died after awakening from the winter sleep and after taking one or perhaps two (I did not watch the flight on the 16th) flights—the only time I have known this to happen.

I visited the barn on October 20th and again on the 24th but without result. On the 26th, however, there were twenty-six adults, all ringed, and fifteen young, of whom four only were males, in residence. The summer had, therefore, passed without fatality. All the inmates were hanging head downwards in a row, and there was no overlapping. They were very restless on the 26th, with a good deal of movement and some squeaking, and they did not really settle down until November 3rd. This restlessness was due almost entirely to the young. One of the young males was black, and he was particularly restless, though it must be remembered that his colouring made him conspicuous. Once they had settled down they showed no knowledge of my presence, and gave no sign of movement until March 10th. On that day all the young and ten of the adults had their heads showing. On the 11th two more adults were awake, but no attempt at departure was made until the 14th when all left (the young had been marked with blue rings) more or less together at 6-34 p.m. The remaining fourteen adults (all yellow rings) were dead. On the 17th the survivors were joined by the males. The total population was then thirty-one, a decrease

of five on the previous spring. The colony continued to use the barn until April 14th.

Third Year.—On October 20th the male colony contained twelve individuals, of whom eight were marked. There had, therefore, been no deaths during the summer, but there had been four additions from outside and these newcomers were duly marked with white rings. As before, they were hanging head downwards and bunched together, but not overlapping. The old black male was in the centre, and the young black male was on the extreme left of the line. The colony was very restless, and there was a good deal of movement and squeaking, but they had settled down by the 28th and remained in a state of absolute coma until March 22nd. Nine left the shed finally on the 27th. One of the three dead was the old black male.

The female colony on October 20th contained twenty adults, all marked, and ten young of whom three were males. Thus three females were missing. Possibly they had joined another group, but I think it more probable that they were dead. This colony had already settled down on the 20th, and though aware of my presence were not unduly restless. They were hanging, as before, bunched together in a row but with no overlapping, with the exception of one young male who passed the whole winter hanging by his thumbs head upwards. As hibernation had already commenced when I first came to the barn I did not mark the young until activity was resumed (for I have found that disturbance of the winter sleep rarely has beneficial results) when they were duly given red rings. The colony remained in a state of torpor until March 24th and the survivors—ten adults died during the winter—were fully awake and active on the 26th, being joined by the males on the 27th. The total population was then twenty-nine, a reduction of two on the previous year and of seven on the year before that, and this population continued to use the barn until April 21st.

Fourth Year.—I was unable to visit the shed until October 29th, and the fifteen males, of whom twelve were marked, were then deep in the winter sleep. There had, therefore, been three additions during the summer—they were duly given white rings when activity returned—and no fatalities. No movement was made throughout the winter. Movement commenced on March 9th and the bats first flew on the 12th, finally leaving the shed on the 16th. There were three deaths this winter, all with green rings.

The female colony, also visited for the first time on October 29th, was also deep in the winter sleep. It was composed of twenty-six adults and fourteen young, of whom five were males. Only fifteen of these adults were ringed, so that two

had died—at any rate were missing—during the summer and there had been eleven additions. When activity returned, the young ones were duly marked with orange rings, and the newcomers, for reasons that will be apparent, with white rings. The bats were hanging in the same position as in previous winters—in bunches together and head downwards—but there was this time considerable overlapping, six of the young ones were hanging from the wings of adults. There was no movement until March 11th. The bats were fully active on the 13th and were joined by the males on the 16th. The death roll during the winter numbered twelve, including four green rings. The total population was, therefore, forty, an increase of eleven on the previous year and four higher than that of the first year in which observation was maintained.

On December 8th of this year I chanced to go into a small brick building long since disused but still in a fair state of repair, a building which had once served as the lavatory for a cottage that had been pulled down, and found there, to my intense astonishment, a further colony of seventeen female noctules with nine young (four of whom I subsequently discovered to be males) hanging in one corner and on the other arm of the same corner six males. This small building was only fifteen yards from the barn and twenty from the shed, and was set more or less between the two. I had visited it off and on during previous winters and found it deserted. That I had not visited it before during this winter was purely accidental ; that I did visit it was equally accidental. I am, however, quite certain that this colony was not in existence, as far as this particular neighbourhood was concerned, before this winter. As soon as returning activity was apparent I marked all the survivors (six females and one male were dead) with white rings, since white rings had come to indicate new arrivals. The first flight was undertaken on March 12th and the sexes were intermingled at roost on the 17th. The building was vacated on the 22nd and from that date until April 12th the barn was used by both colonies indiscriminately mixed together. The total population, then, was sixty-five at the time the barn was abandoned for the summer. For five days before the colonies joined together in the barn, they used the same feeding grounds, flying together and evidently on perfectly amicable terms. Yet previously these feeding grounds had—so far as I could judge—been strictly respected by neighbouring noctules. This sudden influx of twenty-five individuals was most interesting, and I was eager to see whether they would return in the autumn, and, if they did, whether they would again occupy their humble abode or join the native population in barn and shed. Unfortunately, during the summer, owing

to circumstances over which I had no control, I had to leave the district, and was therefore unable to keep any further records. Perhaps it was just as well, as I was getting in a bit of a muddle with my rings anyway—there were too many white ones.

But these observations, though they do not cover so long a period as I had wished, are yet of some interest. They prove—to my satisfaction at least, though I admit that figures for so limited a period (I have been watching and working on bats for nearly twenty years, but had only just begun to concentrate on the noctule, though not to the complete exclusion, even then, of other species), and for one colony only, may well be considered insufficient proof—that females outnumber males in the rough proportion of two to one ; and that the noctule is a regular and close hibernator. They show that death during the summer months is most uncommon (which is not altogether surprising when one remembers the noctule's wonderful proficiency in the air, high average plane of flight and lack of enemies) and that death before maturity is also most uncommon. In this connection it is worthy of note—I do not think it can be called coincidence—that all the deaths, both in the shed and in the barn (and in the one winter in the lavatory), occurred in the middle of the hibernating line. The winter that he died the old black male moved into the middle of the line for hibernation. Not once did I find a death on the outside of the line ; a fact which offers a useful field for speculation. Possibly more warmth was required by their blood? Possibly they were aware of approaching old age and death?

But if observation on hibernacula proves one or two facts, it also raises some very interesting problems. The most interesting, I think, is that of population. Though for the first three years each spring showed a slight decrease—over the three years from 36 to 29—but over the four years the population really remained remarkably steady ; and this despite what might be thought a heavy rate of mortality. During the second winter the deaths among males were particularly heavy, and in the spring the numbers showed a serious decline, the level being restored by the importation of fresh-blood from some outside source. And it seems evident that this process of importation is of regular occurrence, not merely as a means of restoring the level after a disastrous winter, but also as a check to inbreeding in the colony. But whence comes this fresh blood? I cannot believe that a neighbouring colony would ever experience such an increase in population in any one year that transference of certain members to less fortunate colonies becomes essential ; and it would surely be altogether too great a coincidence were

any such abnormal increase to occur just when a serious decrease elsewhere made the importation of fresh blood a matter of paramount importance. In the case of a whole colony founding a hibernaculum on already occupied territory (as in the instances cited above) it seems evident that a colonisation from the continent has taken place, though I admit that proof of such a movement is lacking. If this is so (and I am, personally, convinced of it) it would suggest that the noctule is still extending its range. Apart from the movements of whole colonies (of which I have only one example, and which may be rare) it seems to me that the solution lies with unattached individuals, either migrants from the continent or bats, who during the summer have wandered so far from their winter haunts as to be unable to return in time, and so join up with a colony in need of reinforcement.

I am, indeed, inclined to this "unattached" theory; for it seems to me to be a possible explanation of the phenomenon of winter flight. Over these four years I found the noctule to have very definite periods of activity and hibernation. Retirement for the winter occured each year during the latter part of October, and activity recommenced each year about the middle of March. Variations in date for each movement were so slight from year to year that they may be discounted. Weather and temperature appeared to be of no importance. Moreover, throughout four winters, not one of the bats under observation, male or female, left their sleeping places. Yet in each of these winters I saw noctules on the wing on mild November days—two records in the second winter, and one in each of the others—and in the third winter one on the wing in February. I may, of course, have missed other hibernacula in the immediate neighbourhood (it was impossible for one man to cover the ground so minutely as to avoid any possibility of such an omission) but I do not think so. And even if I did, I find it hard to believe that mild weather, while affecting one hibernaculum, would not affect two others over such a period as four years. I am convinced that these winter flights are undertaken by bats, who are for some reason unattached, and who, if unable to attach themselves to some colony, are forced to hibernate singly or in pairs. Why such individuals should be affected by mild weather, while bats in regular hibernacula remain indifferent is difficult of explanation. Perhaps there is established in the regular hibernacula some bond of sympathy conducive to undisturbed sleep. Perhaps it is not so much mild weather that disturbs unattached individuals as a combination of temperature and unsuitable sleeping quarters. I am at least convinced that winter flights are exceptional. It is probable that they are also suicidal.

It soon became apparent that each noctule colony maintains a strict territory during certain seasons of the year. This territory centres round the hibernaculum. The hibernaculum is the root of the colony's existence : to it, barring accidents, the several members return from birth to death. From the hibernaculum the bats issue for about a month each spring, returning after each hunting flight to rest and sleep. For the first three or four days after awakening from the winter sleep only a short evening flight is taken, but the regular routine of morning and evening flight is adopted very soon and this continues until the colony leaves the winter home for the trees. These hunting flights are conducted over regular grounds and do not appear ever to exceed them. More or less regular, too, is the sequence in which the feeding grounds are visited ; and the grounds themselves are so clearly defined that I was very soon able to map out those of the colony I had under observation as well as the boundaries of some of the neighbouring colonies.

But once the colony has taken to the trees, things become very much more difficult. There is then no sign of any territory, and during the months of May, June, July and August, with the first two weeks of September, individual bats appear to cover considerable distances. Certain dens in the trees are always occupied, but not necessarily by the same bats for any length of time nor necessarily by the bats of the nearest hibernaculum. Other dens seem to be regarded purely as temporary roosting places : good for a night or two, but no more. The summer population in the district I had under observation was always greatly in excess of that of the winter. The peak population in winter (excluding that winter in which a new colony arrived) was fifty-five. During each summer I found several female colonies of thirty or so individuals—one of forty-five—and whilst the largest male colony was twenty, groups of eight to fourteen were quite common. I ringed some bats each summer but never found one so ringed in the winter, though I did find a few in succeeding summers. This summer population is, in fact, a shifting one. Particularly does that refer to the males ; it was most uncommon to find a marked male in the same den for more than a week. Females are more sedentary, as is only to be expected since this is the season in which the young are born. The females of my colony did not all leave the neighbourhood during the early summer, though some appeared to do so. I expected to find them during the months of May and June—and generally did so ; it was less common to find them in July : it was rare, indeed, to find them in August. It should, however, be remembered that it is not possible to search every likely-looking tree, and I may have

missed some in each year. On the other hand, I did find many unmarked females, and, later, unmarked females with young, so that movement among females does occur. Family life, as we know it in birds or humans, is non-existent. The males have no family cares at all. The females are most affectionate mothers, certainly until the young are fledged. Once the young are fledged the mothers do not appear to take any further notice of them, and I have no definite proof that they remain together once that stage has been reached ; but since the young are to be found in the hibernacula, it seems probable that there is some connection between mother and young until the next breeding season. During hibernation the young do not appear to roost next to their mothers nor indeed in any particular order.

The summer population was so greatly in excess of the winter—and this seemed to be the case not only on the restricted ground under close observation but throughout the neighbourhood—that I am at a loss to account for it by any other means than that of migration from the continent. It is possible, even probable, that the number of newly-fledged young on the wing during August account in some measure for the discrepancy ; but it cannot account for the numbers to be seen earlier in the summer. Migration seems to be the obvious solution. Only organised work by a greatly increased number of observers on each side of the Channel will prove if this is so or not.

But a great deal could be done in this country, not only on the noctule but on each of the other British bats, by the ringing method, given a certain number of enthusiastic observers. Working alone (bat enthusiasts are very few and far between) my own attempts at ringing were not so successful as I could have wished or indeed had hoped; and if I were to start again—as I have every intention of doing (with assistance if I can get it) I would have a large selection of coloured rings. I got into a muddle with my rings—a muddle from which I could have extricated myself, I believe—because I did not know as much about the noctule as I thought I did. That really is the one thing I have learnt in nearly twenty years of watching bats—that I know very little. I have unlearnt much more than I have learnt. But I am convinced that by using rings, and by keeping a careful and regular watch on a definite area both in summer and winter, much can be added to our knowledge of these most interesting mammals.

1 Oct. 1941

MANX ENTOMOLOGY, 1940

KENNETH WILLIAMSON and W. S. COWIN

Introduction

A REVIVAL of interest in the study of Manx Entomology, which, with the exception of a single branch, had remained dormant since early in the present century, did not take place until the summer of 1939. Work during the latter part of that season was summarised in a report presented to the Isle of Man Natural History and Antiquarian Society (see Bibliography) by the present writers. It was followed by a second report covering the 1940 season, from which the items of chief interest have been extracted for this paper.

It was essential before commencing work on the Island's entomology to know exactly what had been done before, so throughout the winter 1939-40 the writers found much to occupy their spare time. Research in the Manx Museum Library and among the scientific journals resulted in the production of a fairly complete bibliography, a classified card index containing all the records we could trace, and an up-to-date hand list of the *Lepidoptera* which it is hoped to publish in the more opportune times which will follow the successful conclusion of the war. Attempts were made to recover the notebooks of former students, Henry Shortridge Clarke and Dr. Cassal, but it is feared that these were destroyed after their deaths ; however, the field notes of the late Dr. J. Harold Bailey are fortunately safe in the hands of Mr. H. E. Britten, who has intimated his desire to produce an up-to-date catalogue of the Manx *Coleoptera* at some future date.

The advent of the war very soon after this revival of interest in this greatly neglected insular study did not retard progress, and despite the temporary loss of two collectors, it is felt that very satisfactory progress was made last year. The new records added to the known fauna are enumerated below, and in addition notes on other interesting occurrences are given. The orders are arranged in accordance with Imm's *Text-book of Entomology* (London, 1938).

Thysanura

One example of the primitive Bristle-tail (*Petrobius* sp.) was taken on a stone wall at Cronkbourne on September 20th. This order had not been recognised previously in the Island.

Plecoptera

Three new stone-flies were taken in 1940 as follows : *Chloroperla grammatica* Poda., Peel, May 20th, W.S.C. ; *Isopteryx torrentium* Pict., Mountain Road, May 17th, E.F.L. and W.S.C. ; *Nemoura variegata* Oliv., The Congary, May 20th, W.S.C.

Ephemeroptera

The capture of these insects is especially pleasing as we have been unable to trace any previous reference to this order in Man.

Ecdyonurus lateralis Curt., The Sound, June 6th, and Tromode, July 6th, W.S.C. ; *E. venosus*, Mountain Road, May 17th, E.F.L. and W.S.C. ; *Rhitrogena semicolorata* Curt., Mountain Road, May 17th, E.F.L. and W.S.C., also Langness, H.A.Q.

Odonata

The chief item of interest was the abundance of the Common Sympetrum in the Curragh in early September. The numbers seen were astonishing, and the dragon-flies delighted to bask and sun themselves on the bare ground. Many of the specimens taken were of the black-legged variety, *Sympetrum striolatum nigrifemur* Sely, which is the form usually met with in Ireland, but others were intermediate between this and the typical form, *Sympetrum s. striolatum* Charp.

Trichoptera

One caddis-fly, *Stenophylax permistus* McLach., had no previous record. This was captured on Langness in May by H.A.Q.

Lepidoptera

In this group the work of E. Sloane on the west coast calls for special congratulation. In five years he has produced twelve macros and five micros new to the province, besides confirming three doubtful records. Although these insects were collected prior to 1940 they are included here as Sloane's work did not come to our notice until late in 1939.

It was a poor year for immigrant butterflies, with the exception of the Clouded Yellow, which is dealt with later. The Red Admiral was very scarce, extreme dates being August 7th at Douglas, W.S.C., and October 28th at Peel, G.C. The Painted Lady was about in average strength, being most plentiful in August, when it occurred in numbers among sheltered flowery hollows on Langness, H.A.Q. The Silver Y moth appeared exceptionally early, one being taken on Langness on May 12th H.A.Q., and another at Douglas on June 8th, W.S.C., but the numbers for the season were not large. The Rush Veneer was common both at The Sound and Langness in early June but was not noticed afterwards.

Spring butterflies were noticed as follows : Small Tortoiseshell in early January, E.S., and March 24th, W.S.C. ; Small White, April 27th ; Green-veined, May 2nd ; Wall, May 17th ; Small Copper, May 20th. Seven new species were added to the list.

Species are arranged as in Meyrick's *Lepidoptera*, 1928.

Setina irrorella L. Dew. Marine Drive, June 19th, H.A.Q. H. S. Clarke noted its abundance there in 1891, and in 1901 William Garrett took the larvæ beside a small stream.

Caradrina trapezaria L. Dun-bar. Taken for the first time at Peel, September 2nd, 1937, G.C., and again at Glenmeaye, October 1st, 1940, G.C. and W.S.C.

Graphiphora orbona Hufn. Lunar Yellow Underwing. A new record, Jurby, July 27th, 1939, E.S.

Euclidia mi Clerck. Mother Shipton. Fairly common in the Curragh, a new locality, in May, W.S.C. Hitherto taken only by Dr. Cassal on the Calf of Man in 1905, and by E.S. near Peel.

Eupithecia satyrata Hubn. Satyr Pug. Peel Road Station, May 22nd, G.C. and W.S.C. The only previous reference is in the Rev. H. A. Stowell's list of 1863.

Eustroma associata Borkh. Spinach. Rare, one at Douglas, July 23rd, W.S.C.

Xanthorhoe unangulata Haw. Sharp-angled Carpet. One beaten from ivy, Douglas, May 12th, W.S.C. New.

X. viridaria Fabr. Green Carpet. Uncommon, but Honeyhill, seems a good locality, June 17th, W.S.C.

Hybernia leucophæria Schiff. Spring Usher. A new record from Peel in spring, E.S.

Selenia tetralunaria Hufn. Purple Thorn. A new moth captured at Peel, E.S.

Deilephila porcellus L. Small Elephant Hawk. A beautiful specimen at Langness, June 7th, H.A.Q.

Sphinx convolvuli L. Convolvulus Hawk. A third capture in 1939 was one taken at Peel by John Cowley, July 29th.

Dilina tiliæ L. Lime Hawk. New, at Glenmeaye, June 29th, 1936, E.S.

Argynnis euphrosyne L. Pearl-bordered Fritillary. Dalby, July 8th, 1938, E.S. Confirmation of an old record.

Epinephele tithonus L. Gatekeeper. Three or four noted at bramble blossoms in Glenmeaye, August 22nd, G.C. This species was noticed by the Rev. C. D. Ash in 1895, and has been recorded—but always without specimens—on several occasions since.

E. hyperanthus L. Ringlet. Betsy Charlie's Glen, July 25th, 1937, E.S. Corroboration of another doubtfully recorded species.

Colias edusa Fabr. Clouded Yellow. Distinctly commoner than usual in the Island, which was the most northerly place from which specimens were recorded in 1940 (*Ent.*, LXXIV, p. 58). The first was taken on Langness on July 27th, and altogether four were captured there and others seen, H.A.Q. On August 2nd no fewer than six were seen between Peel and Glenmeaye, G.C. It is noteworthy that all these specimens were seen on days following fairly strong northerly winds.

Euchloe cardamines L. Orange Tip. Very rare and local. Fine males were taken in the Curragh on May 4th, A.H.K., and May 9th, W.S.C.

Phlyctænia fuscalis Schiff. Apparently scarce. Curragh, June 13th, W.S.C.

Alucita pentadactyla Schiff. This exquisite white plume moth was noted for the first time in 1939. In 1940 it was taken at Douglas on July 5th, W.S.C., and a few days later, Miss M. Gawne.

Procris geryon Hubn. Cistus Forester. A puzzling 'new record' at Archallagan, July 15th, 1935, E.S., for its food-plant, Rock-rose, has never been found in the Island. C. I. Paton, however, lists the Spotted Rock-rose, *Helianthemum guttatum*, under the heading 'Escapes and Records requiring Confirmation,' as having been noted by the Rev. S. Gasking, N.W.N.

Pandemis ribeana Hubn. Second Manx record, Douglas, June 14th, W.S.C.

Tortrix unifasciana Dup. Not uncommon at Douglas, May 6th, and subsequently, W.S.C. New.

Laspeyresia gemmiferana Tr. One taken on the Congary, Peel, May 20th, W.S.C. and G.C. New.

Depressaria umbellana Steph. One taken on the small islet of Kitterland, March 3rd, H.A.Q. and K.W. New.

D. purpurea Haw. One taken on Peel golf links, April 28th, G.C. New.

Lithocolletis faginella Zell. One taken in Ballacraine Orchard, May 3rd, H.A.Q. and W.S.C. New.

Coleoptera

It is several years since this order last attracted attention, but the additions noted by Mr. Frank Balfour-Browne (*Nat.*, 1911, pp. 131-163) bring the very comprehensive list prepared by Mr. P. M. C. Kermode from the late Dr. J. H. Bailey's collection to over 800 species.

It is mainly owing to the enthusiasm of a new collector, E. F. Ladds, that a number of interesting species, two of which are new, were taken in 1940. It is to be hoped that this order will receive further attention as the Museum list gives no indication as to the status of the species or the localities in which they occur.

The new records are *Chætocnema concinna* Mm., Foxdale, May 18th, E.F.L., and Douglas, May 29th, W.S.C., and *Cassida rubiginosa* Nl., Langness, May 17th, E.F.L. One of the special Manx and Irish species, *Phosphuga subrotundata* Le., was taken on Langness, May 17th, by E.F.L., who also took *Carabus granulatus* L. at Douglas on May 18th, a species not represented in the Museum collection. The ladybird *Coccinella 7-punctata* L. was first recorded on February 26th and was last seen on October 18th.

Hymenoptera

Twenty out of the many captures in this invariably interesting group proved to be new to the province.

Tenthredinoidea.—*Tenthredo arcuata* Forst., abundant on flowers of *Oenanthe crocata*, Tromode, August 2nd, W.S.C.; *Tenthredopsis nassata* L., June 5th, W.S.C.

Apoidea.—*Andrena bicolor* F., Cronkbourne, June 23rd, W.S.C.; *Colletes succinta* L., Cronkbourne, September 8th, W.S.C.; *Bombus jonellus* Kirby and *B. distinguendos* Mora. taken August 11th in sheltered flowery hollows on the peninsula of Langness by W.S.C. and H.A.Q.

A strong colony of the mining-bee, *Halictus rubicundus* Chrid. (not an addition) was found in the bare earth outside the walls of the Langness lighthouse enclosure, August 22nd, K.W., H.A.Q., W.S.C.

Vespoidea.—*Pompilus crassicornus* Schr., the first Spider-hunting Wasp to be taken in the Island, Cronkbourne, August 25th, K.W.; *Ammophila campestris* Latr., the first Sand-Wasp, Rue Point, July 25th, W.S.C.; *Vespula rufa* L., Douglas, July 30th, W.S.C.; *Ancistrocerus parietinus* L., taken in a Douglas potting-shed along with several of its beautiful parasites, *Chrysis ignita* L., so undoubtedly nesting there, May 26th, W.S.C.

Formicoidea.—*Myrmica ruginodis* Nyl., one of the three races into which the Red Ant is now separated, Douglas, H.S.C.; *Lasius flavus* F., flying in numbers on the Mountain Road, August 1st, H.S.C.; *Formica fusca* L., taken at Kionslieu, April 18th, and in the Corrany valley, August 15th, W.S.C.

Ichneumonidae.—*Amblyteles armatorius* Forst., Douglas, October 18th, E.F.L.; *Pimpla maculator* F., Gob y Deighan, July 4th, W.S.C.; *Glypta* sp., Cronkbourne, August 25th, K.W.; *Cosmoconus elongator* F., Tromode, September 1st, W.S.C.; *Ipoctonus atomator* Mull., Cronkbourne, August 25th, K.W.; *Ametastigia equiseta* Fall., Bulgham Bay, August 27th, W.S.C.

Proctotrupidae.—*Exallonyx niger* Panz., Douglas, October 13th, W.S.C.; *Proctotrupes gravidator* L., Douglas, September 22nd, W.S.C.

Cynipoidea.—*Rhodites eglanteriæ* Htg. Specimens of the Rose Pea Gall were found on leaves of Dog Rose at Ramsey, July 30th, W.S.C.

Diptera

Mr. T. F. Fargher, the Sanitary Inspector at Ramsey, has given us some interesting details of the uncomfortable mosquito plague suffered by the inhabitants of that town in 1938. The species chiefly concerned

were *Aedes detritus* Hal. and *Aedes dorsalis* Meigen, both found breeding in brackish water at Pooyl Dhooie. *A. dorsalis* was also found breeding in non-saline water, a habit which Edwards (*British Blood-Sucking Flies*, p. 13) says has not been recorded in the British Isles.

As might be expected, the bulk of the new records belong to this immense and little-worked order, and they are as follows, arranged, for want of an authoritative classification, in alphabetical order of genus :

Anisopus punctatus Mg., Douglas, July 30th, W.S.C. ; *Bactis thodani* Pict., Ramsey, October 21st, W.S.C. ; *Buceutes geniculata* Deg., Cronkbourne, August 25th, K.W. ; *Calliphora vomitoria* L., Bulgham Bay, August 27th, W.S.C. ; *Catabomba pyrasti* L., Douglas, August 23rd, E.F.L. ; *Chielotrichia cinerescens* Mg., Douglas, April 25th, W.S.C. ; *Chironomus chloris* Mg., flying in swarms near the Eairy Dam, April 18th, E.F.L. ; *Chrysoclamys cuprea* Scop., Cronkbourne, June 23rd, W.S.C. ; *Coleopa pilipes* Hal., Douglas, February 21st, W.S.C. ; *Ernestia radicum* F., Curragh, August 5th, G.C., W.S.C. ; *Exechia spinigera* Wein., Ramsey, November 15th, W.S.C.

Dilophus febrilis F., abundant and widespread in the Mountain area, May 17th, E.F.L. and W.S.C., noted as one of the main items in the food of the swallow (*Hirundo r. rustica*). It was seen up to August 25th.

Doliochopus ungulatus L., Cronkbourne, June 16th, W.S.C. ; *Empis chioptera* Flu., Curragh, May 9th, W.S.C. ; *Empis nuntia* Mg., Douglas, June 13th, W.S.C. ; *Empis tesselata* F., Glenmeaye, June 23rd, W.S.C. ; *Eristalis infricarius* L., Curragh, May 30th, H.A.Q. and W.S.C. ; *Ernestia radicum* F., Curragh, August 5th, G.C. and W.S.C. ; *Exechia spinigera* Wein., Ramsey, November 15th, W.S.C.

Gramophyia maculata Scop., Glenmeaye, June 23rd, W.S.C. ; *Hæmotopota pluvialis* L., most abundant and vicious, and called locally ' the Croggan ' fly, Douglas, June 19th, W.S.C. ; *Helina auceps* Zett., Cronkbourne, August 25th, K.W. ; *Hilara maura* F., Foxdale, May 18th, W.S.C. and E.F.L. ; *Hydrotaeæ irritans* Flu., flying in clouds, and certainly living up to their name, in the Curragh and Glenmeaye, June 13th, W.S.C.

Isochryosyrphus glaucius L., Glenmeaye, September 1st, W.S.C. ; *Limnia marginata* F., Cronkbourne, August 25th, K.W. ; *Limonia chorea* Mg., Douglas, from May 2nd to August 24th, W.S.C. ; *Limonia nubeculosa* Mg., Douglas, May 29th, W.S.C. ; *Limosina zosteræ* Hal., Douglas Pier, H.S.C.

Melanostoma mellinium L., Cronkbourne, August 25th, K.W. ; *M. scalere* F., Douglas and Glenmeaye, May 12th, W.S.C. ; *Myiatropa florea* L., Glenmeaye, June 23rd, W.S.C. ; *Nephrotoma flavescens* L., Douglas, June 18th, W.S.C. ; *Opomyza germinationis* L., Ramsey, September 20th, W.S.C.

Pegomyia nigritarsis Zett., Douglas Pier, H.S.C. ; *Pentaneura longimanus* Stacy, Douglas, August 23rd, K.W. ; *Phaonia basalis* Zett., Curragh, September 6th, G.C. and W.S.C. ; *Platychirus manicatus* Mg., Cronkbourne, June 16th, W.S.C. ; *Polietes lardaria* F., Cronkbourne, September 29th, W.S.C. ; *Psila nigricornis* Mg., Foxdale, May 18th, E.F.L. and W.S.C.

Rhamphomyia nigripes F., Mountain Road, May 17th, E.F.L. and W.S.C. ; *R. sulcata* Mg., Foxdale, May 18th, E.F.L. and W.S.C. ; *Sapromyza sordida* Hal., Douglas, May 31st, W.S.C. ; *Scatophaga stercoraria* L. var. *merdaria* F., Douglas, April 1st, K.W., and later in Glen Rushen. *Sciara carbonaria* Mg., Douglas Pier, H.S.C. ; *Sciara placida* Wain., Douglas, April 22nd, W.S.C. ; *Sciomyza pallidiventris* Flu., Douglas, August 29th, W.S.C. ; *Simulium latipes* Mg., Foxdale, May 18th, E.F.L. and W.S.C. ; *Spaniotoma aterrima* Mg., Douglas, March 30th,

K.W. ; *Syrphus bifasciatus* F., Douglas and the Curragh, May 8th, W.S.C. ; *S. ribesii* L., Douglas, April 25th, W.S.C.

Thaumalea verralli Edw., Douglas, September 29th, W.S.C. ; *Tipula lateralis* Mg., Ballacain Dub and Tromode, May 16th, W.S.C. ; *T. marmorata* Mg., Druidale, May 12th, W.S.C., and Peel, G.C. ; *Trichocera regelationis* L., Douglas, March 30th, K.W., very abundant and also taken at Peel ; *Volucella pellucens* L., Tromode, June 27th, W.S.C.

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Abbreviations

G.C. =George Clementson, Peel.
H.S.C. =H. S. Cowin, Douglas.
W.S.C. =W. S. Cowin, Douglas.
E.F.L. =E. F. Ladds, B.A., Douglas.
A.H.K. =A. H. Karran, Douglas.
H.A.Q. =H. A. Quillin, Langness.
E.S. =E. Sloane, Patrick.
K.W. =K. Williamson, Douglas.

RECORDS

Clouded Yellow Butterfly, Colias croceus (Fourcroy) at Keighley (v.c. 64).

On July 4th, a hot sunny day, I had a very good view of a Clouded Yellow on the wing at High Cote, Riddlesden, Keighley. It was flying very low over the grass at the roadside when first sighted and made three attempts to settle, then fluttered about over a nearby privet hedge for some time before flying away over some gardens. The insect appeared to be in perfect condition and the orange colour of the wings was particularly rich.—M. Longbottom.

Argynnis aglaia near Darlington

One afternoon in the middle of July my son was walking through Catkill Lane (a disused and wooded packhorse road about 4 miles N.E. of Darlington) ; he saw scores of brown butterflies ; two of these he captured and brought to me. They proved to be *Argynnis aglaia*, Dark Green Fritillary. He has been visiting this place regularly for the past six years and has not before seen anything of this species, although

he is always on the lookout for anything worth reporting to me. The food plant, Dog Violet, is plentiful in the locality. On August 2nd I saw a single specimen of *A. aglaia* on a Thistle flower at Barmpton, about 2 miles south of the above locality. This species is not mentioned in a list of lepidoptera of Darlington district by the late John Sang, published in 1898. An old entomologist, Henry Millburn, tells me that he has taken it years ago in the same locality as above. I have not been able to hear of any one who has seen this butterfly in recent years.—John E. Nowers.

YORKSHIRE ENTOMOLOGISTS AT ABERFORD

M. D. BARNES

When the Yorkshire Entomologists met at Aberford on June 21st it is doubtful if the weather could have been more favourable for the collecting of insects. Yet in spite of the good weather the number of insects in evidence was surprisingly small, though Mr. Hincks reports that sawflies were fairly abundant.

As might be expected on such a sunny day, butterflies were much in evidence, though not many species were noted. Probably the most interesting lepidopteron observed was the Fiery Clearwing (*Sesia chrysidiformis*), which appeared to be present in some numbers in the Hazel Wood district, four being counted in the course of an hour in different parts of the woods.

During the excursion the party divided into two, one section working the Hook Moor area, the other concentrating on Hayton Wood and Hazel Wood.

Diptera (C. A. Cheetham)

Flies were scarce, and fortunately the wood pest, *Hydrotæa irritans*, was not present, due, no doubt, to weather conditions. The large *Sarcophaga carnaria* (L.) was plentiful, and one or two specimens of *Echinomyia fera* (L.) were seen. It was interesting to see *Chilosia maculata* (Fln.) plentiful, though its host plant, Garlic, had died down leaving little but the seed heads. *Leucozona lucorum* (L.), *Chalarus spurius* (Fln.) were caught with *Limnobia tripunctata* (F.), *Dicranomyia autumnalis* (Staeg.), and *Ormosia albitibia* (Edw.). The most interesting Tipulid taken was *Tipula irrorata* (Macq.), others being *T. scripta* (Mg.), *T. hortulana* (Mg.), *T. unca* (Wd.) [*longicornis* (Sch.)], and *T. lunata* (L.) [*ochracea* (Mg.)].

Hymenoptera Ichneumonidæ (W. D. Hincks)

About thirty species of *Ichneumonidæ* occurred, but the few Cryptinæ were nearly all odd males and therefore not readily determinable.

A.=Aberford. H.=Hook Moor.

Ichneumon extensorius (L.), A., taken by Mr. W. Pickles.
Alomya debellator (F.), A., H.
Gelis (*Pezomachus*) *instabilis* (Forst.), A.
Cryptus difficilis (Tschek.), A., taken by Mr. W. Pickles.

Hymenoptera Tenthredinidæ (W. D. Hincks)

Sawflies were fairly abundant and I am grateful to Mr. R. B. Benson of the British Museum for determining the specimens captured. Besides those listed a few species of *Tenthredo* and Dolerus were not brought home,

and several additional species were among the material of Mr. J. Wood, including a species of the striking genus *Croesus*.

Arge ustulata (L.), 1 ♀, A.
Tenthredo maculata (Geoff.), 1 ♂, H.
T. arcuata (Forst.), 1♀, A.
Tenthredopsis nassata (L.), 3 ♀♀, A.; 1♂, H.
T. exisa (Thoms.), 1♀, A.
Macrophya annulata (Geoff.), 1 ♂, 1 ♀, A.; 1 ♂, H.
Strongylogaster lineata (Chr.), 2 ♀♀, H.
Selandria sixi (Voll.), 1 ♀, H.
Aneugmenus stramineipes (Klug.), 1 ♀, H.
Fenusa ulmi (Sund.), 1 ♀, H.
Hoplocampa cratægi (Klug.), 1 ♂, H.
Stethomostus fuliginosus (Scht.), 1 ♀, H.
Pristophora pallidiventris (Fall.), 1 ♀, A.

DERMAPTERA (W. D. Hincks)

Forficula auricularia (L.), A.

COLEOPTERA (W. D. Hincks, M. D. Barnes)

(W. D. Hincks)

Triplax ænea (Schal.), H.
Simplocaria semistriata (F.), H.
Dorcus parallelopipedus (L.), larvæ only, H.
Matthodes marginatus (Latr.), H.
Malachius bipustulatus (L.), H.
Stenochorus meridianus (Pz.), A., taken by Mr. C. A. Cheetham.
Lema melanopa (L.), H.
Phædon fumidulus (Germ.), A.
Phyllodecta vitellinæ (L.), A.
Hydrothassa marginella (L.), A.
Longitarsus luridus (Scop.), A.
L. suturellus (Df.), A.
L. melanocephalus (Deg.), A.
Phyllotreta undulata (Kuts.), A., H.
P. nemorum (L.), A.
Batophila rubi (Pk.), H.
Sphæroderma testaceum (L.), H.
Derocrepis rufipes L., A.
Chalcoides fulvicornis (F.), H.
Cassida rubiginosa (Ml.), H.
Phytonomus arator (L.), H.
Cionus alauda (Hbst.), A.

(M. D. Barnes)

Calvia 14-guttata (L.).
Cychramus luteus (F.).
Athous hirtus (Hb.).
A. hæmorrhoidalis (F.).
Corymbites incanus (Gy.).
Helodes minuta (L.).
Cyphon coarctatus (Pk.).
Cantharis pellucida (F.).
C. pallida (Gz.).
C. livida (L.).
Rhagonycha lignosa (Ml.).
Malthinus flaveolus (Pk.).
Clytus arietis (L.).
Leiopus nebulosus (L.), taken by Mr. W. Pickles.
Grammoptera ruficornis (F.).
Cryptocephalus labiatus (L.).
Gastroidea polygoni (L.).
Cassida flaveola (Thunb.).
Anaspis humeralis (F.).
Rhynchites nanus (Pk.).
R. betuleti (F.).
Cidnorrhinus 4-maculatus (L.).
Ceuthorhynchus erysimi (F.).
Magdalis cerasi (L.).
Dryocætes villosus.

LEPIDOPTERA (M. D. Barnes)

Pieris napi.
P. rapæ.
Euchloe cardamines.
Aglais urticæ.
Pararge megæra.
Epinephile ianira.
Chrysophanus phlæas.
Sesia chrysidiformis.

NEWS FROM THE MAGAZINES

The Entomologist's Record for July contains 'Secondary Sexual Characters in British Moths,' by D. D. Murray; 'The Genetics of *Rhyacia rubi* View. ab *ochracea* Walker and ab *flava* Walker,' by E. A. Cockayne; 'More Notes on *Eriogaster philippsi* Bart.,' by A. M. S. Talhouk; '*Lauxaniidæ*=*Sapromyzidæ* (Dipt.) taken in Surrey,' by L. Parmenter; Collecting Notes; Current Notes; and Supplement, 'The British Noctuæ and their Varieties,' by H. J. Turner.

YORKSHIRE NATURALISTS' UNION AT CAWOOD

Difficulties of catering both at Selby and Hemingbrough were found when our Divisional Secretary, Mr. C. W. Mason, tried to arrange for the V.C. 61 meeting, and eventually Mr. W. G. Bramley kindly arranged for a tea and meeting at Cawood. By crossing the river we were able to work in V.C. 61 and an interesting meeting was the result.

The district has not been visited previously by the Union and few of our members will have seen the end of the River Wharfe as it joins the Ouse at Wharfemouth. Many interesting plants were seen, and probably the Clouded Yellow Butterfly has not been seen on a Union meeting before, or at least for a great many years.

The most interesting fly was *Tipula peliostigma* Schum. This has been recorded previously, but probably all the records should have been *Tipula cava* Riedel., and this will now be an addition to our list. It is certainly not a common insect in the North, though it is so more to the South. *T. oleracea* L. and *Pachyrrhina lineata* Scop. (*histrio* of our list) were fairly plentiful. The large *Volucella pellucens* L. was one of the most noticeable owing to its size and blotched wings. Two gall makers were caught, *Paroxyna parvula* Lw. (*absinthii* of list) and *Tephritis miliaria* Schrk. (*O. flava* Lw.).

Other interesting species were *Sicus ferrugineus* L., *Ptychoptera contaminata* L., *Empis trigramma* Mg., *Hæmatopota pluvialis* L., *Chloromyia formosa* Scop., *Syrphus luniger* Mg., *Dolichopus unguiculatus* L., and *Voria trepida* Mg.

Entomology (T. Stainforth) : Lepidoptera.—The weather conditions were ideal for entomological collecting, and the lush vegetation along the banks of the Ouse appeared rich in promise, a richness the terrain did not belie. All collecting was carried out on the East Riding bank of the river. Early in the excursion the Clouded Yellow Butterfly showed itself, and during the day some half-dozen examples were seen, one of which was evidently ovipositing on leaves of clover. Two specimens, captured by Mr. H. Whitehead, B.Sc., were in a much worn condition, indicative of a long migratory flight. A full-grown specimen of the beautiful caterpillar of the Sword-grass moth (*Calocampa exoleta*) was obtained in the sweep-net. Other caterpillars noted were those of the Orange Tip Butterfly on Nasturtium ; Common Blue Butterfly on Lotus ; Cinnabar moth on Ragwort ; Small Tortoiseshell Butterfly on Nettle ; and Puss moth and Poplar Hawk moth on Poplar.

The Large Skipper Butterfly was common together with the Meadow Brown, Small Heath, Common Blue, and Small Copper. The little black Chimney Sweeper moth (*Odezia atrata*) flitted in some numbers among the herbage, contrasting strongly with the whiteness of the Five-plume moths (*A. pentadactyla*) disturbed among Convolvulus. Silver-Y moths were also seen.

Coleoptera.—A most abundant plant on the banks of the Ouse is the Tansy, and examination of its leaves yielded the brilliant Tansy beetle (*Chrysomela graminis*). The beetle and its larva were found dispersed along the whole of the East Riding bank of the Ouse traversed on this outing, that is, between Wharfemouth and Kelfield. At Kelfield it was quite as abundant as I have ever seen it at the well-known locality for this species at Clifton Ings on the Ouse bank at York. Not only was the beetle itself common, but some of the Tansy plants at Kelfield had also hundreds of the ungainly rotund brown larvæ feeding upon their aromatic foliage.

Very abundant on Polygonum, and found in every sweep of the net, was *Gastroidea viridula*, resembling somewhat in miniature the *Chrysomela*. The sister species, *G. polygoni*, occurred also, but in much smaller numbers. The brilliant little *Lema melanopa* was very common on the herbage.

The dominant beetle on the edge of the mud at high-water mark

was *Bembidion lunatum*. It was almost exclusively the only member of this riparian genus I could discover. I found, however, one example of *B. stomoides* and a few *B. lampros*. Mr. J. J. Small, B.Pharm., obtained a specimen of the Sexton beetle, *Necrophorus vespillo*.

A visit was paid to a large brick-pond at Kelfield. Here, on the leaves of reeds, cocoons of a Whirligig beetle were not uncommon. From four that I brought away have since hatched examples of *Gyrinus caspius* (*elongatus*).

The following is a list of the beetles identified :

Bembidion lunatum Duft.
B. atroviolaceum Duft. (*stomoides* Dej.).
B. lampros Hbst.
Pterostichus vulgaris L.
P. vernalis Gyll.
Anchomenus dorsalis Pont.
Stenus biguttatus L.
S. tarsalis Ljungh.
Tachyporus obtusus L.
Stilicus orbiculatus Pk. (*affinis* Er.).
Phaganthus (*Anthophagus*) *caraboides* L. (*testaceus* Gr.).
Quedionuchus cinctus Pk.
Necrophorus vespillo L.
Phalacrus fimetarius F. (*coruscus* Pz.).
Epuræa depressa Gyll. (*æstiva* Er.).
Lathridius lardarius De G.
Meligethes æneus F.
Coccinella bipunctata L.
C. septempunctata L.
Gastroidea viridula De G.
G. polygoni L.
Lema melanopa L.
Cassida rubiginosa Muell. (and larvæ on thistles).
Phædon armoraciæ L.
Cryptocephalus labiatus L.
Chrysomela graminis L.
Phyllotretan emorum L.
Longitarsus jacobææ Wat.
Microcara testacea L. (*livida* F.).
Cantharis fulvicollis F.
C. lateralis L. (*oralis* Germ.).
C. livida L.
C. rufa L.
Rhagonycha fulva Scop.
Phytonomus (*Hypera*) *rumicis* (reared from reddish silken cocoon on Polygonum leaf).
Phyllobius parvulus Ol. (*virideæris* Brit. Cat.).
Apion hydrolapathi Kirb.
Ceuthorrhynchus erysimi F.
Gyrinus caspius Men. (*elongatus* Aub.).
Athous hirtus Hbst. (*niger* Brit. Cat.).
Dolopius marginatus L.

Odonata.—At the pond at Kelfield agrionid dragonflies were abundant. Samples of these were taken by Mr. J. J. Small and myself and were found to consist of three species in about equal numbers, namely, *Cænagrion puella*, *Enallagma cyathigerum* and *Ischnura elegans*.

Freshwater Biology (H. Whitehead) : Sweeping with the net along the river banks from Cawood to Wharfemouth and later along the marshes between Kelfield and Cawood, failed to capture a single specimen of caddis-fly, stone-fly, or may-fly. The apparent absence of these insects can be understood when the nature of the river bed here is considered. Owing to a strong tidal sweep in addition to the river flow, the water remains turbid with fine silt and there is nothing stable to which aquatic plants can attach themselves and thus provide shelter for insect larvæ. An extensive survey of the River Wharfe was made during 1926-27 (*Journ. of Ecology*, 1930, pp. 273-305) and Ulleskelf (only $3\frac{1}{2}$ miles from Wharfemouth) was one of the collecting stations. At this point larvæ of only two species of caddis-fly, one species of may-fly, and no stone-flies were taken. Comparing this with the station at Collingham Bridge, the number of species found were 11, 11, and 9 respectively, indicating a rapid falling off of insects of these groups which is no doubt connected with the change in the character of the river bed between Collingham and Ulleskelf. Conditions at Cawood are very similar to those at Ulleskelf.

A large pond at Kelfield was visited. A sweep among the vegetation on the banks failed to yield caddis-flies, may-flies, and stone-flies. Dragon-flies were numerous and are reported upon by Mr. Stainforth.

There was comparatively little vegetation in the pond, but willow rootlets to which filamentous algæ were attached sheltered a variety of small organisms and the following were found in a sample when examined at home. Two species of caddis larvæ belonging to the genera *Mystacides* and *Polycentropus* ; nymphs of a may-fly, *Clæon* ; larvæ of chironomids (Tanypeds) ; small crustacea, *Simnocephalus* and *Cyclops* ; some water mites ; common hydra (*H. vulgaris*) and empty statoblasts of the Polyzoan, *Cristatella mucedo*. Statoblasts are not eggs, but resting buds which remain dormant throughout winter and germinate in the spring. The statoblasts of this species are very characteristic—dark circular discs about one millimetre in diameter with tiny anchor-shaped projections. The adult colonies (not found on this occasion) are about 2 in. in length and are jelly-like, the projecting tentacles giving a furry appearance. The colonies are a favourite object for the microscopist.

Ornithology (F. W. Bond) : The district should be worth working at more favourable ornithological seasons. Actually birds were not very numerous. Sedge-warblers were common along the Ouse banks. Swallows and Black-headed Gulls were fairly evenly but sparsely distributed along the river. One Lesser Black-backed Gull was seen. A flock of about 50 Lapwings, accompanied by Starlings, rose on one side of the river, while on the other a pair of Lapwings seemed to have young about, judging by their fierce attacks on a young Carrion Crow, which was nearly overcome by fright or heat or both, and once let us catch it, though able to fly. Other birds observed in ones or twos were Magpie, Heron, Moorhen, Common Sandpiper, Cuckoo, Greater Spotted Woodpecker, Corn Bunting, Yellow Wagtail, and Pied Wagtail, the last two in close company by the river's edge. There were also Rooks, Jackdaws, Blackbirds, Song Thrushes, Greenfinches, Yellowhammers, Common Whitethroats, Willow Warblers, Hedge Sparrows, Skylarks, Wood Pigeons, Swifts, Partridges, and House Sparrows. Other members of the party reported House Martins, Sand Martin, and Turtle Dove.

Flowering Plants (W. A. Sledge) : The ground above and below Cawood on the East Riding side of the Ouse consists of well-drained, grassy banks rising too steeply from the river to afford suitable habitats for many marsh species. For a short distance above the bridge, where the ground is incompletely colonised by grasses, alien Crucifers were conspicuous, among which *Erysimum cheiranthoides* was noteworthy. Throughout the whole area *Pimpinella major* is very abundant and *Allium Scorodoprasum* and *A. vineale* are also plentiful below Cawood. *Crepis biennis* was noted on the raised bank below the bridge. Later it was again met with in fields on the right bank of the river in V.C. 64. In both localities it was present in quantity. On the Ouse banks *Agropyron repens* var. *glaucum* (Doell) often gave a pronounced blue colour to the grassy vegetation. Other plants seen were two trees of *Populus nigra* var. *betulifolia* on the roadside west of Kelfield and *Ceratophyllum demersum* in a pond between Riccall and Kelfield. Other species observed included the following :

Ranunculus sceleratus L.
Nasturtium sylvestre R. Br.
N. palustre DC.
Barbarea vulgaris Br.
Sisymbrium altissimum L.
S. orientale L.
Erysimum cheiranthoides L.
Brassica nigra (L.) Koch.
Lepidium Draba L.
Reseda Luteola L.
Hypericum hirsutum L.
Hypericum perforatum L.
Geranium pratense L.
Impatiens glandulifera Royle.
Medicago sativa L.
Poterium officinale (L.) A. Gray.
Conium maculatum L.
Pimpinella major (L.) Huds.
Matricaria inodora L.
M. Chamomilla L.
M. Matricarioides (Less.) Porter (*M. suaveolens* Buch.).

Tanacetum vulgare L.
Achillea Ptarmica L.
Carduus crispus L.
Crepis biennis L.
C. capillaris (L.) Wallr.
Sonchus arvensis L.
S. asper (L.) Hill.
Campanula latifolia L.
C. glomerata L.
Myosotis palustris Hill.
Solanum Dulcamara L.
Mimulus guttatus DC.
Veronica Beccabunga L.
Polygonum petecticale (Stokes) Dr.
Allium Scorodoprasum L.
A. vineale L.
Bromus commutatus Schrad.
Agropyron repens (L.) Beauv. var. *glaucum* (Doell.).

YORKSHIRE NATURALISTS' UNION AT PICKERING

The proposed week-end at Hartoft had to be abandoned and difficulties in finding rooms made it necessary to reduce the excursion to one day. Fortunately Mr. E. G. Highfield, of Pickering, was able to find a tea table and food, and he provided us with a fine outing if somewhat strenuous. The botanists saw the long-leaved Sundew, *Drosera anglica*, in a Yorkshire locality, probably for the first time on a Union excursion. Unfortunately no lepidopterists or coleopterists were present, but the butterflies were very varied and plentiful,the Dark Green Fritillary was with us all day, Whites were not numerous, while other species noted were Meadow Brown, Small Copper, Small Skipper, Common Blue, and on Paxton Common a lot of Graylings and an odd Ringlet.

Diptera of one type, *Hydrotæa irritans*, were too plentiful, others were in less quantity but more interesting and a very nice addition to the county list was a Tachinid of an unusual group, the Phasiinæ, the insect, *Allophora hemiptera* F., is very unlike a Tachinid in appearance, and its host is one of the hemiptera. Other Tachinids were *Eriothrix rufomaculatus* Deg. (*Oliveria*) and *Dexiosoma caninum* F. Craneflies were few, *Tipula paludosa* Mg., *T. fulvipennis* (*lutescens*), and *Pachyrrhina lineata* Scop. (*histrio*). Two gall makers, *Trypeta onotrophes* Lw. and *Sphærophoria menthastri* L. A few hover-flies, of which the large *Volucella pellucens* L. was the most obvious, *Chilosia illustrata* Harr., *C. carbonaria* Lw., *Eristalis rupium* F., *E. arbustorum* L., *Helophilus pendulus* L., *Chrysochlamys cuprea* Scop., and *Syritta pipiens* L. Others include *Elgiva albiseta* Scop., *Nemopoda cylindrica* F., *Dolichopus wahlbergi* Zti., and *Conops flavipes* L.

Ornithology (Ralph Chislett) : With the nesting season past except for a few late broods, with most young birds already on the wing, and with many family parties already on the move down the valleys and river sides, birds were not much in evidence, either visually or orally. Odd Yellow Hammers were almost alone in song. Swifts screamed and wheeled above Pickering in large numbers, and were still entering their holes, but their remaining days there could only number few. Nevertheless the ornithologists had an interesting time. Holes occupied in 1941 by Green Woodpecker and by Pied Flycatcher were shown to us by R. M. Garnett. The Crow family was well in evidence. Lesser Redpoles were noted. Of the Titmice, Coletits were the most numerous. Goldcrests and Redstarts were heard and seen with flying young. Turtle Doves were seen twice, near to the limit of their range on this side of Yorkshire ; and Coot and Moorhen were noted. During the excursion 32 species were identified, to which were added on the following day : Bullfinch, Skylark, Wheatear, Whinchat, young Cuckoo with Meadowpipits, Curlew still anxious, Red Grouse, and Red-legged Partridge. Moorland birds are generally more thinly distributed over the moors of the North-east than on those of the North-west of the county.

It was interesting to see a Glow-worm in a valley bottom, and a Common Lizard on the high, stony ground, across which a Toad was also seen to be making its way. To see the rare plants of Dalby Marsh, and

other plants I know better as inhabitants of lower sandy ground (Bunter, and moraine deposit) at home in the crumbled surface of the high-lying oolitic limestone, also gave us pleasure.

Botany (E. R. Cross) : Although our numbers were few the whole excursion proved most interesting and successful.

Mr. E. G. Highfield led the party up Newton Dale, where the fern, *Polypodium calcareum*, was pointed out in a flourishing condition. This fern was discovered by Mr. Highfield two years ago, and is a new record for this part of Yorkshire. *Crystopteris fragilis* and *Polystichum angulare* were perfectly at home here.

On the way up the Dale striking patches of *Campanula latifolia* were seen.

Walking up Farworth the Whitby road was crossed to the ' Fox and Rabbit,' where a short stay was made, and other members of the party joined. Walking down to Dalby Dale fine patches of *Malva moschata* (White) were seen. Arriving at Dalby Bog many members were soon up to their knees in water. A fine array of *Epipactis palustris* was found, and among many other bog plants, *Drosera rotundifolia, D. anglica, Serratula tinctoia, Habenaria conopsea, Listera ovata, Orchis prætermissa, Parnassia palustris, Selaginella selaginoides, Cirsium heterophyllum, Pinguicula vulgaris, Anagallis tenella.*

A small party then ascended the dale, and on and near Paxton Common found large quantities of *Verbascum thapsus*. Other plants seen were *Solanum dulcamara, Bryonia dioica*—male only ; no female could be found. *Echium vulgare, Lithospermum officinale, Humulus lupulus, Cirsium eriophorium* in profusion, *Carlina vulgaris, Inula squarrosa, Carduus acanthoides, Rubus saxatilis* in fruit, *Hypericum humifusum*, and fine masses of *Geranium pratense*.

On the way across the moor to Howldale through which we walked to Pickering, the magnificent Scots Pines were a glorious sight. Nuts were seen in great plenty, and Crowberries and Bilberries were in abundance.

On the way to Pickering from Scarborough *Viscum album*, which is uncommon in the district, was seen covering several apple trees, and some fine clumps of *Artemisia absinthium* were very striking.

Freshwater Biology (H. Whitehead) : Most of the time was spent by the writer in collecting aquatic insects which had emerged from Pickering Beck and were found either on vegetation on the banks or in flight near the stream.

Trichoptera : *Allotrichia pallicornis* Eaton. (a micro-caddis) and *Agapetus comatus* Pict. appear to be first records from V.C. 62. *Lepidostoma hirtum* F. and *Odontocerum albicorne* Scop. occurred, and several specimens of *Hydropsyche*. Unfortunately the last named were all females and specific determination is doubtful. In the lower part of the stream large numbers of *Mystacides azurea* L. were hovering over the water in characteristic fashion.

Ephemeroptera : *Baetis pumilus* (Burm.) and *Ephemerella ignita* Poda were common, and specimens of *Habrophlebia fusca* Curt. and *Clodon rufulum* (Müll.) were taken.

Plecoptera : A few *Isoperla grammatica* (Poda) were caught. The most interesting capture of the day was a male *Leuctra* showing unusual characters. Mr. M. E. Mosely, to whom the specimen was submitted for examination, suggests that while it may prove to be an aberrant example of *L. fusciventris* Steph., it is desirable to obtain more specimens from this locality.

The whole outing proved most profitable and exceedingly enjoyable and interesting.

On the Monday following a few members visited the Hole of Horcum and found quantities of *Cornus suecica* in very fine fruit.

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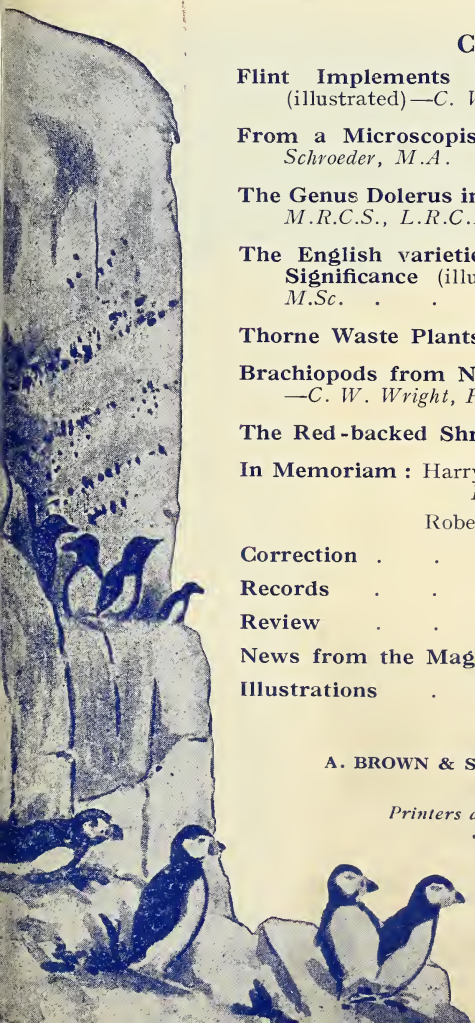

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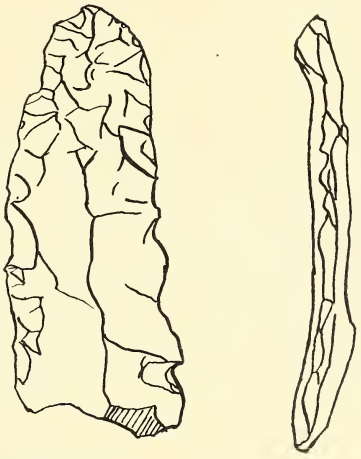
FLINT IMPLEMENTS FROM FLAMBOROUGH HEAD

C. W. AND E. V. WRIGHT

A COLLECTION of flint implements was made from the fields along the cliff top between Danes Dyke and Sewerby, and again at Beacon Hill, with a view to finding the industry described by Mr. J. P. T. Burchell.

Most of Burchell's figured specimens find their counterparts in the present collection. The first lot of specimens was sent



to Mr. Miles Burkitt and his opinion was asked. He considered them to be of early Bronze Age. He writes :

' Naturally I have been interested in seeing your stone industry. In my opinion there is little doubt that it should be assigned to a period fairly early in the Bronze Age. Specimen No. 61 shows the typical thin flaking technique which one has come to associate with industries dating from the Beaker to the Middle Bronze periods. But actually the type of tool intended in this case—though never completed—would have been a " slug." Now " slugs " occur with Food Vessels. Furthermore, the other specimens (mostly round scrapers with one or two rough awls and small hand-chopper) are rather too poorly made for the Beaker period, in my opinion,

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and conform quite well with earlyish Bronze Age industries from various parts of the country.'

It is probable then that the Flamborough Head district was the centre of the flint industry for East Yorkshire, for the number of cores, tools, flakes, etc., on the fields here is enormous.

The collection is interesting as giving a general sample of what is to be found, and not merely a selection of the more complete tools. It shows, therefore, the relatively large numbers of ' duds ' that there were in the manufacture of tools. From an inspection of collections of flints on exhibition, one would gather no idea of the amount of flakes and other by-products of the industry. The proportion of tools in this lot is comparatively small. Indeed, it is really smaller than it appears from this collection since, in collecting, unconsciously only the more interesting specimens are picked up.

The collection has been presented to the Mortimer Museum at Hull, where it can be seen. In Mr. T. Sheppard's opinion, they are quite typical of the thousands of Neolithic specimens from the Yorkshire Wolds in the Mortimer Museum. They perhaps more nearly conform to the types illustrated and described in his ' Neolithic Workshops near Bridlington ' (*Naturalist,* August, 1910, and *Hull Museum Puvlication* No. 74), and several are almost identical with those figured in an article on ' Palæolithic Man in Yorkshire ' (*see Naturalist,* August, 1930, pp. 287-292, and *Hull Museum Publication,* No. 169).

FROM A MICROSCOPIST'S NOTEBOOK

W. LAWRENCE SCHROEDER, M.A.

It is interesting to note the ways of freshwater snails in regard to their main habitat. At times species of *Limnæa* will move out of the water and on the side of the jar, apparently contemplating their universe from a new angle ; but almost always the luxury of the fresh sensation is over-indulged, and the creature dries to extinction. But *Oncylus fluviatilis* can remain above the water-line for a considerable time and then resume its place in the usual environment. On February 5th I found *Oncylus* in copulation ; shortly after egg clusters were laid. On February 7th one of the snails climbed an inch or so above the level of the water and remained there—so far as day-time observations could ascertain—until March 1st, when it descended to the level of the water without entering it. For a time the creature was content, with the water gently touching the edge of the shell ; then there was a slight withdrawal, for about three-quarters of an inch, while it meditated for about four hours the possibility of complete immersion. Finally,

in it went, doubtless with the satisfaction that accompanies the prodigal's return. In the meantime egg clusters—in twos and threes, but mostly in threes—had developed. Later layings were in clusters of five.

One of the most active of bivalves was the young of *Sphærium lacustre* ; it was $\frac{1}{20}$ in. in length and its foot was almost as long as the shell. It seemed to indicate the fastness of youth, in its comparatively rapid motion, as compared with the leisurely sedateness of its elders.

It is fascinating to watch the development of the snail spawn and to note the way in which young *Limnæa* move within their circular chamber, until gradually they lick their way into the wider world. I noticed a *Gammarus pulex*, the freshwater shrimp, detach a middle-aged *Limnæa* from the side of the jar and work it towards the hinder part of its body, for what purpose I cannot guess, but the snail resented its dislodgement, and worked itself free and floated to the top of the water, settling on the water-film with admirable detachment.

Gammarus may often be seen nosing about the snails ; not, I imagine, for any love of their sedate company. Snails are not a fussy crowd ; they move leisurely ; they remain motionless for lengthy periods ; they seem like the ancient villager who in answer to the kind lady who inquired what he did with himself, said, ' Well, mum, I just sits and thinks, and sometimes I only sits.' *Paludina vivipara* often simply ' sits.'

The shells of dead snails are usually cleaned out by Isopods, *Asellus aquaticus*, very like our woodlice. They are efficient scavengers, and most of the empty shells I have taken from my jars have been rendered fit for the collection by their service.

In 1910 a friend gave me some *Bythinia tentaculata*. They flourished exceedingly, and at the moment their descendants are in number in the jar their ancestors inhabited. They survived a dry crossing to the Isle of Man three years ago—I thought I had lost them—but after a couple of weeks drought and on the replenishment of the jar with tap water they emerged, fewer in number, but apparently with a great determination to persist. Without any fresh addition to the original company of about fifteen creatures for over thirty years *Bythinia* has helped to keep the bell-jar clean. Long may it flourish !

The Entomologist for August contains ' Under Water Emergence of the Subimago of *Heptagenia lateralis* (Curtis) (Ephemeroptera),' by D. E. Kimmins ; ' The Breck : an Excerpt from a Lepidopterist's Diary, with Notes on Light,' by E. W. Classey ; ' Some Wiltshire Insects,' by K. Williamson and W. S. Cowin ; ' On Rearing Lepidoptera,' by F. Littlewood ; and numerous notes and observations.

THE GENUS DOLERUS IN YORKSHIRE

W. J. FORDHAM, M.R.C.S., L.R.C.P., D.P.H.

The article by Mr. Hincks in *The Naturalist* for September reminds me of some unpublished records of mine in this genus. In the following list will be found two species added to the Yorkshire list by Mr. Hincks, namely, *Dolerus gessneri* and *bimaculatus*. All the specimens have been verified by the Rev. F. D. Morice or Dr. R. C. L. Perkins.

Family : TENTHREDINIDÆ

Sub-family : DOLERINÆ

Dolerus æneus Htg. This common species has occurred to me at Bubwith, Allerthorpe, Fylinghall, Escrick, Skipwith, Bolton Abbey, Forge Valley, Dent, Austwick, Cronkley, Askham Bog, Edlington, and Robin Hood's Bay.

D. æriceps Th. Allerthorpe, ♂, 11/7/31.

D. anthracinus Kl. Allerthorpe, 3♂, 26/3/30.

D. asper Zadd. (*oblongus* Cam.). Allerthorpe, 20/4/24, ♂ ; 25/5/29, ♂ ; 29/5/30, ♀.

D. bimaculatus Geoff. Bubwith, ♀. Askham Bog, 20/6/25.

D. germanicus F. Gunnergate, N. Yorks., ♂♀, 8/7/17. Skipwith, 6/6/18. Askham Bog, 25/7/18.

D. gessneri And. Middleton-in-Teesdale, ♀, 30/5/25. This species was taken by Butterfield at Barden-in-Wharfedale, 6/6/18.

D. gonager F. This common species has been taken by me at Allerthorpe, Edlington, Whitkirk (V.C. 64), Middleton-in-Teesdale, Fylinghall, and Barmby Moor.

D. hæmatodes Schr. Bubwith, ♂, 17/6/16. Allerthorpe, 6/26, ♀. North Duffield, ♀, 10/6/17. Coxwold, 21/4/19.

D. madidus Kl. Skipwith, ♂♀, 6/6/18.

D. niger L. Bubwith, ♀, 17/6/16. Skipwith, ♀, 16/5/18. Allerthorpe, ♂, 5/6/22.

D. nigratus Mull. Bubwith, ♀, 8/5/18 ; ♂ 18/5/18 ; ♀, 25/5/18. Skipwith, ♀, 5/5/19. Austwick, ♀, 12/5/21. Robin Hood's Bay, ♀, 8/6/24. Allerthorpe, 2♂, 20/5/29 ; ♂, 28/4/27 ; ♂, 15/5/30.

D. nitens Zadd. Allerthorpe, ♂♂, 25/3/21. Coxwold, ♀, 21/4/19. An early species.

D. palustris Kl. Bubwith, ♂♂, 17/6/16. Skipwith, 6/6/18.

D. picipes Kl. Bubwith, ♀, 27/5/10. Allerthorpe, ♀, 21/6/25.

D. pratensis L. Bubwith, ♂♀, 17/6/16.

D. rugosulus D. Torre. Allerthorpe, 14/4/27, 20/4/27. Battersby (V.C. 62), ♂, 6/5/22.

D. sanguinicollis Kl. var. *ravus* Zadd. Skipwith, ♀, 25/6/23.

The Entomologist's Monthly Magazine for September contains ' *Brachypalus eunotus* Loew. (Dipt. Syrphidæ) new to Britain ; its Distinctions from *B. bimaculatus* Macquart. and Notes on Synonymy in the Genus,' by R. L. Coe ; ' Notes on Mites found associated with Cultures of Ptonid Beetles,' by N. E. Hickin ; ' The Distribution of *Lucanus cervus* L. (Col. Lucanidæ) in Britain,' by H. Donisthorpe ; ' New Species of Staphylinidæ (Col.) from Borneo.' by M. Cameron ; ' Notes on Irish Siphonaptera, III,' by E. O'Mahony ; ' Notes on the Genus *Amauris* (Lep. Danaidæ) with Description of four New Forms and Description of a New Sub-species of *Pseudacræa deludens* Neave (Nymphallidæ) resembling *A. echeria contracta* Talbot,' by G. Talbot ; and several shorter notes.

THE ENGLISH VARIETIES OF *ECHINOCORYS* AND THEIR SIGNIFICANCE

with an illustration from the Chalk of Yorkshire

JOHN F. HAYWARD, M.Sc.

Introduction

In the course of the statistical investigations described in previous papers by the present writer it was found necessary to mention in more than one place the fact that certain of the varieties of the Sea Urchin *Echinocorys* which had been described were of doubtful biological significance. In view of the fact that *Echinocorys*, perhaps more than any other fossil, has been subject to this style of nomenclature, it is necessary to give the question a rather detailed treatment. The problem will be considered from two viewpoints, for even if it can be demonstrated that the varieties under consideration have no *biological* status, it may still be convenient to retain their use for purely *stratigraphical* purposes.

Summary of Research

A full history of the research which has been connected with this urchin would be as unwieldy as it would be unnecessary, but completeness requires at least a summary of the work of the chief geologists who have tackled the problem.

The critical point in the study of the genus was undoubtedly the publication of Wright's monograph on the *British Fossil Echinodermata from the Cretaceous Formations*. The part which contained *Echinocorys* appeared in 1882. It is not proposed to give an account of the researches previous to that date. Wright gave a detailed synonymy consisting of 118 references dating from Plot's *Natural History of Oxfordshire* in 1677. The list was not entirely comprehensive, but altogether 17 specific names, with variations of them, were mentioned, and these were attributed to half-dozen or so genera. It was Wright's work to simplify this confusing nomenclature, and to standardise the naming of the genus. His action was as follows :

1. He restored the generic name *Echinocorys*, originally proposed by Breyn [1732]. The name *Ananchytes* had been substituted by Lamark [1801] and it was by this name that the genus was generally known.

2. Agreeing with Forbes [1852] and others, Wright was of the opinion that all the described forms could be referred to one species. To this was given the name *E. vulgaris* which had been adopted by Breyn in 1732. This name, being pre-Linnean, was afterwards discarded in favour of *E. scutata* Leske, by which it is still known.

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The Work of Rowe and Brydone

Unfortunately, Rowe has not given a detailed analysis of this genus, as he did in the case of *Micraster* [1899], but he probably intended to do so. His numerous references to it in his various papers give a fairly clear idea of his views, and his writings also contain a number of remarks which can well apply to any echinoid genus. He takes as a criterion for the formation of a species or variety the possession of certain features which ' stamp it as characteristic of a definite horizon, and place it apart from its fellows.' It must also be fairly abundant. The essential point in his opinion is therefore the stratigraphical value of the fossil. On the other hand, Smiser, in his recent monograph, mentioned below, maintains that the basis for distinction should be morphological rather than stratigraphical. The following passage of Rowe's refers to *Micraster*, but it might be applied equally to *Echinocorys* :

> ' Another dominant fact, which is elicited by an enquiry based on extensive zonal collecting, is that true species and strong varieties cannot be, save in rare instances, picked out indiscriminately from the different horizons, nor can they be characterised as sharply-defined and separate entities, but must be regarded as mere landmarks in the life-history of the genus. To arrive at any true appreciation of their value, both as to the validity of their claim to specific distinction and as to their usefulness as zonal guides, one must examine the facies of the genus in each horizon, and then one cannot fail to be impressed by the fact that passage-forms are the rule, and that sharply-defined and typical species are the exception. It is the horizon, and not the species, which rules the issue ; the species are but culminating points of certain dominant horizonal characters ' [1899, p. 497].

Rowe was by no means fond of creating new species, and even when he introduced the term *Micraster praecursor*, he intended it to stand for a group name rather than a true species. He realised even then, however, that common usage would soon give it specific rank.

He followed Wright in regarding the known forms of *Echinocorys* as belonging to a single species, but certain salient ' shape-variations ' were treated as varieties. These he designated sometimes by latin varietal names, and sometimes in the vernacular. The most important of his papers were those relating to the English Coast Sections, and here numerous references to *Echinocorys* appear. In all, more than a dozen ' shape-variations ' were recognised.

R. M. Brydone went a step further than Rowe. He utilised to the full the resources of the Linnean System of Nomenclature, and while admitting the fact that *Echinocorys scutata* is a single species, he described, and gave latin names to a number of varieties. In some of these it is possible to recognise ' shape-variations ' already mentioned by Rowe. Brydone has been an assiduous collector, and more than two

thousand specimens which he has obtained from various localities have already been examined by the present writer. Basing his work upon his collections from Hampshire, Brydone was responsible for six varietal names for details of which reference may be made to the original papers [Griffith and Brydone, 1911 ; Brydone, 1912, 1939.]

Continental Authors

It is hoped that at a later date the writer will be able to examine the material to be found in collections outside the British Isles, and until then, he cannot consider the significance of the many species of *Echinocorys* which are still recognised on the Continent. The object of the present paper is therefore to discuss the varieties described in the literature of this country, but at the same time, there are two continental authors who deserve more than a passing reference in view of the monumental nature of their works. Both of the monographs were based upon the collections contained in the Musée Royale d'Histoire Naturelle in Brussels, and while the one dealt with the Echinocorythidæ in general, the other dealt more specifically with *Echinocorys*.

Lambert [1903] suggested two methods of subdividing the family, and recognised that neither was entirely satisfactory. Regarding *Echinocorys* itself, he attempted to find some scheme for the formation of species. A large number of these had been described (many of them since the time of Wright, it should be mentioned) and many were obviously valueless. Lambert thought that the best method was to seek to recognise the different forms and to group them as varieties. He accordingly listed a number of species which he regarded as central, together with others which he grouped around them, and with these he constructed what purported to be a family tree.

Smiser [1935], a third of a century later, worked upon the considerably augmented material of the same museum. He believed that the basis for the establishment of species should be morphological rather than stratigraphical. He recognised that many species had been erected upon very slender grounds and that, in many cases, specific differences are not always noticeable until it has been possible to compare extremes without seeing the passage forms ! He stated that any specific or varietal subdivision must, in part at least, be artificial, and he recognised the frequency of intermediate forms. While Lambert had used a binomial nomenclature Smiser treated many of the types as varieties and named them accordingly.

Although both authors stated clearly the limitations of the species concept as applied to *Echinocorys*, they both retained many existing species, and were not behindhand in

adding to the list. Lambert made himself responsible for a considerable handful of new species, and Smiser was not to be outdone. He even created an *E. lamberti*, apparently oblivious to the fact that Gauthier had, in 1889, already used the name.

Problems of Nomenclature

That certain difficulties have been encountered in dealing with the classification of *Echinocorys* and its relatives has already been pointed out by the author [1940b]. It was found that whereas there is a close relationship between *Echinocorys* and certain species of *Holaster*, it was not possible to draw a hard and fast line between the two genera.

Turning to discuss the subgeneric classification of *Echinocorys* it is found that similar difficulties occur. Smiser's suggestion, referred to above, that it is often necessary to compare extremes without seeing passage forms is very illuminating, and illustrates the difficulties admirably. *Echinocorys* is, indeed, one more example of the fact that our system of classification, though suited perhaps to the needs of the zoologist, is not nearly so satisfactory when applied to the problems of palæontology. The classical case is that of the Paludinas in which a smooth form with little or no ornamentation can be linked to a highly ornamented form by a large number of intermediates. A. E. Trueman, in discussing the Carboniferous freshwater mussels, has the same experience :

> ' Extreme variants thus differ greatly from typical examples of *C*[*arbonicola*] *aquilina* and approach forms to which specific names have been given. All these variants belong to one homogeneous group which presumably lived as a freely interbreeding community and which may be compared with a variable group of Unios living together at present ; nevertheless it has been found convenient to apply names to these variants which are easily recognised and which have more limited ranges than the group as a whole ' [1932-3, p. 71].

Similarly, however varied may be the extreme forms of *Echinocorys*, there is no evidence of more than one biological group present at any horizon, and it is possible to take a number of such extremes, and to interpolate between them sufficient passage forms to make it clear that the extremes cannot logically be separated. Some attempt to do this has been made in Figure 1, based upon specimens from Hampshire.

That even so broad a unit as the genus is not always well defined has been pointed out in connection with the study of corals. It was noticed by Smith and Lang [1930, 1935] that certain colonial corals possessed a number of corallites which would normally be regarded as of an entirely different genus or species from the parent body. That is to say, there are

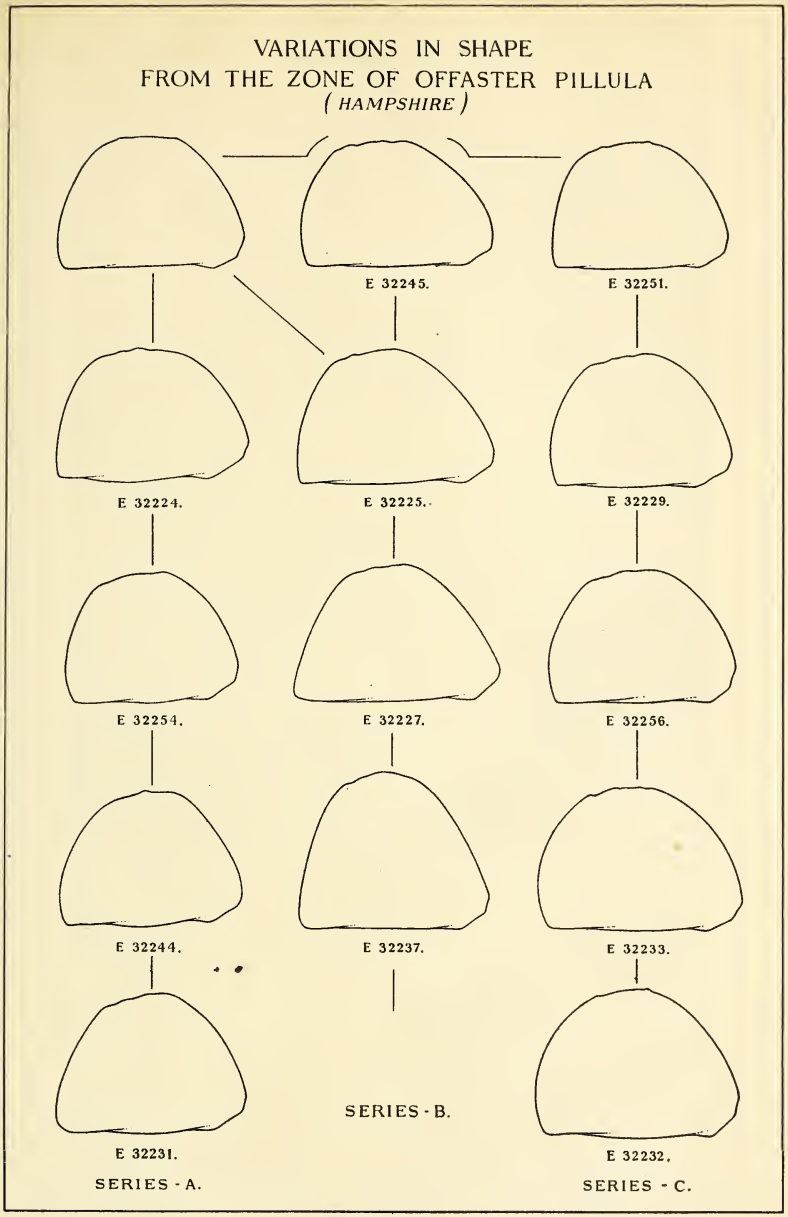

Figure 1

The specimen in the top left-hand corner is from the Sedgewick Museum, No. B34600, figured in Brydone, R.M., 'The Stratigraphy of the Chalk in Hants,' Plate 3, Fig. 29. Zone of *Actinocamax quadratus* (unrestricted), sub-zone of *E. scutata* var. *depressula*, Odiham, Hants. The other specimens bear the registered numbers of the British Museum (Natural History), and are all from the A. W. Rowe Collection, Base of (unrestricted) *A. quadratus* zone, Pauls Grove, Portsdown Hills, Hants. Brydone, in 'The Zones,' records that this pit exhibits both of the subdivisions of the (sub) zone of *Offaster pillula*. All specimens approximately half size.

The specimens are arranged in three series, exhibiting three tendencies :
A. Increasing obliquity of apical area. B. Increasing steepness of test.
C. Increasing roundness of test.

some corallites in the ancestral colony which anticipate the variations which will later give rise to new forms. Since the two kinds are present in the same colony, it is impossible to use separate generic names, and the term ' genomorph ' has been introduced. The name of the form which anticipates, but does not actually constitute a new genus is placed in braces { } after the main generic name.

C. D. Ovey [1938], in studying Foraminifera, found that something of the same kind could be proved, but that, as the Foraminifer is not a colonial animal, the problem is not quite the same. The method could, however, still be used.

The genomorph idea, while it does not help in dealing with the varietal forms of *Echinocorys*, does at least remind us that our system of classification must be used with caution.

As was stated above, a study of large groups of *Echinocorys* makes it clear that, as far as size and proportions go, the whole of the specimens of any horizon form a homogeneous group, and there is no justification for subdividing that group. Proceeding from horizon to horizon, it is found that the same homogeneous group changes, but it is not the less homogeneous. There is therefore no ground for the formation of subspecific divisions.

On the other hand, it has been clearly demonstrated that *Echinocorys* can be used to great advantage as a stratigraphical index. The work of R. M. Brydone in connection with the southern part of England has resulted in a valuable analysis of the formerly unrestricted zone of *Actinocamax quadratus*. Some of the subdivisions are based upon varieties of *Echinocorys* which have been recognised by Brydone. Other authors have demonstrated that Brydone's zones, originally proposed for the Hampshire area, hold good for other parts of southern England. Although I have suggested in a previous paper [1941a] that the forms which are usually separated out as worthy of varietal rank are, on the whole, extreme or striking forms, which are not necessarily typical of the majority, this fact need not detract from their value as stratigraphical indexes. The erection of varieties for this purpose may therefore be justified, though it is necessary to make the proviso, always applicable to zone fossils, that the fauna as a whole, and not any individual specimen, is the criterion of a horizon. While I should feel fairly competent to state the approximate horizon of any reasonably large group of *Echinocorys*, I should hesitate to do so with single specimens, however ' characteristic.'

An Illustration from the Chalk of Yorkshire

In a previous paper [1941c] it was mentioned that there was in one Chalk zone in Yorkshire a typical shape tendency

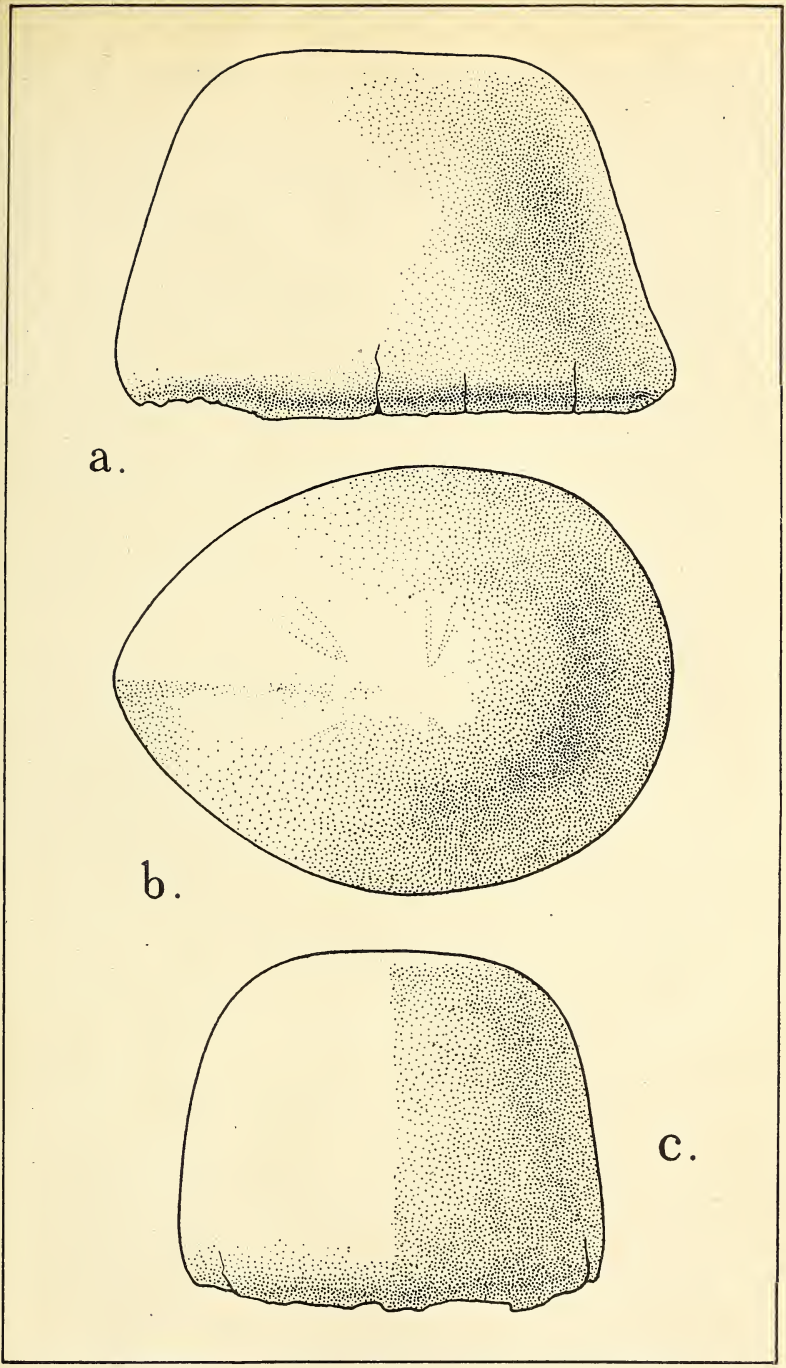

Figure 2

Specimen typical of *Marsupites* zone in Yorkshire. (Beverley, Yorks.).
C. W. and E. V. Wright Collection. Actual size.

exhibited by *Echinocorys*. No attempt was, however, made to describe this form until the theoretical aspect of the ' varieties ' of *Echinocorys* had been discussed. In the present section a compromise is made between the recognised system of the erection of ' varieties ' and some ideal system which may one day be evolved.

Figure 2 illustrates a specimen which on statistical grounds has been selected as typical of the *Marsupites* zone of Yorkshire. The following facts are pointed out :

1. The specimen figured possesses the modal dimensions for the zone, that is to say, it is what I have previously described as the ' typical form ' for the zone and locality.

2. This specimen is larger than the forms typical of this zone in either East Anglia [1940, p. 71] or Southern England [1941a, p. 303, and Figs. 40, 41].

3. The Length/Breadth ratio (' Narrowness ') agrees with the very remarkable peak value exhibited in the *Uintacrinus* subzone in the Southern area. The basal sections are therefore similar in shape.

4. W. C. Ennis [1929] stated that the examples of *Echinocorys* in the *Marsupites* zone of Yorkshire are distinctly taller and more pyramidal than in the other zones. If by this he referred to *actual* height, he was incorrect, for the modal height is greater in the *Actinocamax quadratus* zone than in the zone which precedes it. If, on the other hand, he signified that the *relative* height (' Steepness ') was greatest in this zone, he was again wrong, for this was actually least in the *Marsupites* zone. [See Hayward, 1941c, p. 112.]

5. No varietal name will be proposed for this specimen, for it belongs to the same homogeneous group as other specimens from the zone, some of which may not possess the size, proportion, or shape characteristics mentioned herein or illustrated in the figure. This applies equally to other specimens figured in previous papers [1940, 1941a].

It will be noted that in certain of the figures in these papers more than one specimen from a horizon was figured. In some cases two specimens, both of typical size and proportions, were of very different shapes.

6. The shape of the specimen is typical of a large percentage of the *Echinocorys* of this zone in Yorkshire. Any reasonably large group of specimens, all from the same Yorkshire locality and horizon, and all approximating to this one in their dimensions, which contains a number possessing this pronouncedly flat-topped tendency, may reasonably be expected to come from this zone. Flat-topped forms are, of course, found in Southern England, but they occur in the zone of *Micraster cordnguinum* and the lower part of the zone above it.

7. The complete zonal identification of any exposure must be based not upon any single specimen of *Echinocorys*, but upon the whole *Echinocorys* and non-*Echinocorys* fauna.

Summary

The general conclusions which the writer has reached as a result of the study of the material are :

1. The specimens of *Echinocorys* from any horizon form a homogeneous group.

2. From horizon to horizon, the nature of the group changes, but it remains homogeneous.

3. There is a tendency for the hitherto described varieties of *Echinocorys* to be extreme or striking forms which are not necessarily typical of the majority.

4. The use of such varieties as stratigraphical indexes has, however, certain advantages, but the varieties do not form part of the system of classification described in the International Rules. [See the Recommendation in the International Rules which reads : ' Certain biological groups which have been proposed distinctly as collective groups, not as systematic units, may be treated for convenience as if they were genera, but they require no type species.' No doubt the same is applicable to subdivisions of the genus.]

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THORNE WASTE PLANTS

W. A. SLEDGE

A CENTURY ago Thorne Waste was the richest locality for marsh plants in the north of England. *Scheuchzeria* and *Dryopteris cristata* were numbered among its treasures, while *Peucedanum palustre*, *Andromeda*, *Carex limosa*, *Dexhampsia setacea*, *Osmunda regalis* and the three *Droseras* were some of the many other rarities which formerly flourished here. The gradual impoverishment of the flora began with the draining of the moor which has for many years past been completely intersected by dykes, and before the publication of Lee's *Flora* some of the rarer species were disappearing or, as in the case of *Scheuchzeria*, were already extinct.

Although peat digging and drying of the peat surfaces due to the drainage dykes has changed the vegetation, the warping

which has been practiced round the borders of the Waste has a more drastic and immediate effect leading rapidly to coarse grasses becoming established on the warped surfaces to be followed shortly by agricultural development and the raising of potato crops or other farm produce on an area which a year or two previously was peat moor.

I visited this area for the first time on August 17th with Dr. J. P. Rowlands and Dr. Taylor, of Thorne, who is intimately acquainted with the botany of the district. We first visited Whittaker's plantations which now form a series of boggy thickets composed principally of birch, on the South-west margin of the Waste. Though there is no definite statement to that effect in the *Flora* there can be little doubt that it was in these thickets that *Dryopteris cristata* formerly grew. Great quantities of *D. dilatata* and *D. spinulosa* dominate one area and display considerable variation. One form of *D. dilatata* suggested a cross between that species and *D. spinulosa* : its fronds 4 feet in height, grew upright, not arching outwards and drooping, and were lanceolate in outline with the lower pinnæ narrowed downwards.

In the area lying between the Ouse and Trent north-east of Thorne known—no longer very appropriately—as Marsh-land, *Peucedanum palustre* was locally plentiful in the early years of last century. It now has few stations outside the fens of East Anglia where it forms the principal food plant for the caterpillars of the Swallow-tailed Butterfly. Before the close of the century it had decreased in Yorkshire to such an extent that the south-west border of the Waste was the only certain locality in which it was still known to persist. It was seen here again on the occasion of the Yorkshire Naturalists' Union excursion to Thorne Waste in 1907, but as Dr. Taylor had not seen it for the past thirty years my hopes of finding this plant were slender. A short search, however, soon resulted in three or four plants being found. A more prolonged hunt for other colonies was unsuccessful.

On all the dyke sides and open ground hereabouts *Calamagrostis lanceolata* grows in profusion.

The second area we examined lies at the north-eastern side of the Waste. It is here that the Spectacles Wells are situated. To the initiated this name now has an almost legendary ring for it was here that *Scheuchzeria* was ' abundant' in 1832, although in 1870 Dr. Lees could find no more than ' one flowerless example,' and this is the last record for the plant in the West Riding. The one-inch Ordnance Survey shows a pair of ponds on the north-eastern side of the Waste lying on the western side of and close to the Swinefleet warping drain. Further to the south are several marshy ' pits ' again lying close to the warping drain which here forms the eastern

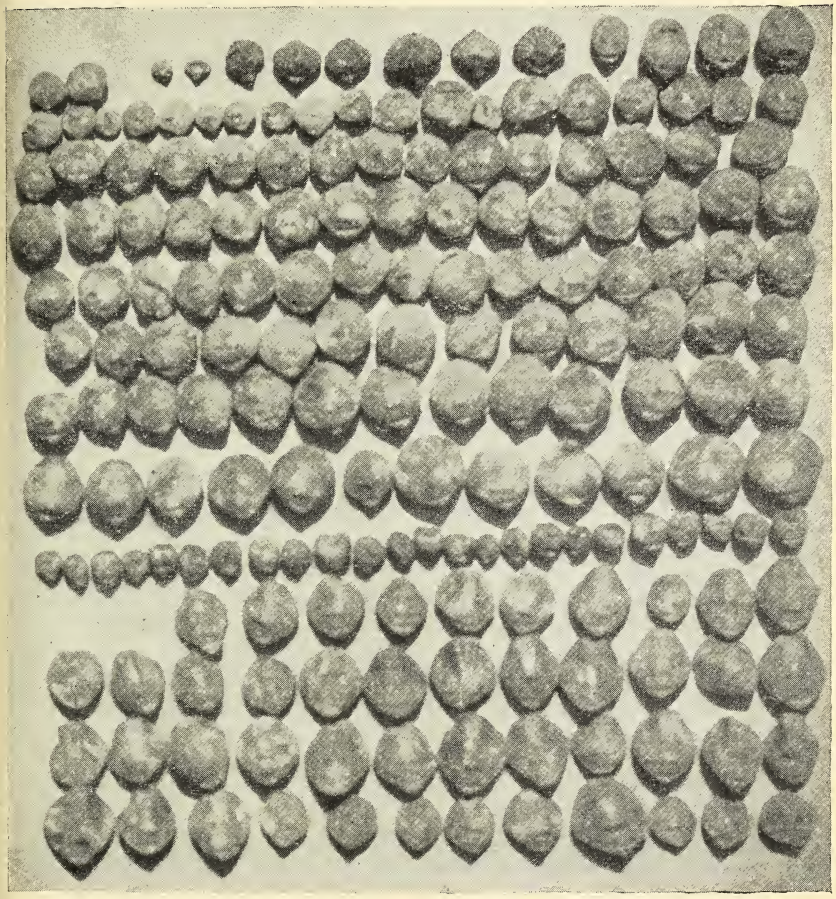
boundary of the Waste. The former constitute the Spectacles Wells and, though usually cited as on Thorne Waste they lie within the parish of Goole and belong to Goole Moor. The moor on this side of the great drain has not been worked, but extensive tracts have been worked for peat, though cutting has been discontinued for some years. No open water remains in the Wells which now form a pair of quaking bogs with *Eriophorum vaginatum*, *E. angustifolium*, *Oxycoccus quadripetalus*, *Carex curta* and *Drosua rotundifolia* as the principal species. The smaller of the two is carpeted by *Sphagnum* and *Oxycoccus*, which form too thin a covering to cross with safety. One could hardly conceive of the locality being any wetter a century ago than it is to-day, and the conditions in this respect are not unlike those prevailing at the Rannoch Moor station for *Scheuchzeria*. First impressions raised high hopes therefore that at least *Drosera anglica*, *Rynchospora alba*, *Carex limosa* or *Deschampsia setacea* might still be found. But a thorough search revealed no species which does not occur in most of the wetter pockets on the surrounding moor. The disappearance of all the rarer species from an area which seemed so ideally suited to them is doubtless attributable to the former peat cutting operations. Though the cuttings in the immediate vicinity of the Wells are shallow and more or less filled in with thick growths of *Eriophorum vaginatum*, *Calluna* and *Andromeda*, they probably led to a temporary drying out or partial drying out of the wells sufficient to exterminate those species which can least tolerate such a change. The present soaking conditions represent a reversion to the original state following upon the choking of the cuttings. Dr. Lees, in the *Supplement*, attributes the disappearance of *Dorscea anglica* and *D. intermedia* to peat digging and fires. The abundance of *Andromeda* here and on other parts of the Waste illustrates the fact impressed upon me at Hatfield Moor earlier in the year that this species is decidedly tenacious and capable of persisting on relatively well-drained peat surfaces. The impression formed from this visit was that most of the plants might yet be found on the less accessible parts of the Waste, but only after experiencing the difficulty of the terrain and its painfully prolific entomology can one judge the measure of determination which would be required to search so large an area.

The Entomologist's Monthly Magazine for August contains ' Reactions of Certain Diptera to Colours,' by E. Hardy ; ' Some Breeding Records of British Tipulidæ (Dipt.),' by R. L. Coe ; ' *Phædon cochleariæ* F. var. *hederæ* Illig. (Col. Chrysomelidæ) New to Britain,' by S. A. Taylor ; ' A new Genus and Species of Formicidæ (Hym.) from Papua,' by H. Donisthorpe ; ' Casidæ from the New Hebrides,' by K. G. Blair ; ' Larvæ of British Beetles. II. A Key to the British Lamellicornia Larvæ,' by F. I. van Emden ; and several shorter notes.

BRACHIOPODS FROM NETTLETON, LINCS.

C. W. WRIGHT, F.G.S.

On a recent visit to the iron mine at Nettleton we discovered nearby a pocket of brachiopods in the upper part of the Claxby



ironstone. So far as could be seen in the small exposure the pocket formed a lenticular patch intercalated in the series. It was only about 4 in. thick and our excavations uncovered an area about 1 ft. by 1½ ft.

From this material we obtained over 170 brachiopods, mostly well preserved. The Hauderinian brachiopods of Lincolnshire have not been treated since Davidson's *Monograph*

of the Brachiopods, and so the following list of species from the pocket contains only his names.

Rhynchanella multiformis Röner.
Waldheimia walkeri Davidson.
W. ornithollus var. *tilbyensii* Dav.
W. tamarinda var. *magna* Dav.
Terebratula sella var.
T. depressa (numerous vars.).

The '*T. sella* var.' is distinct from the common Aptian forms of *T. sella* and may be a separate species. The '*T. depressa* vars.' are, I think, quite different from the Albian and Cenomanian *Rectithyris depressa*. There are probably four species of Terebratulids in this collection apart from the 'Waldheimas.'

Pockets and bands crowded with brachiopods are not uncommon in the Jurassic and Cretaceous rocks, but this is the first we have heard of from the Claxby Beds. Brachiopods are common in the Claxby ironstone, but nowhere reach an abundance comparable with that of the pocket.

THE RED-BACKED SHRIKE

G. H. AINSWORTH

As there are few recent records of the Red-backed Shrike from the East Riding the following notes, which were made during June, 1941, may be of interest.

A bird was first seen one evening of the second week of June while I was cycling along the Warne road towards Hull. When some distance away I saw the bird glide down from the telephone wires on which it had been perched. That glide and the long tail made me think it was a Shrike, and on getting closer to the bird (which returned to the wire) my opinion was confirmed.

Later, when I saw this male bird through glasses, the slight hook in the bill and its shining blackness, more black than the legs, were apparent. The black band across the eyes gave it a fierce look. The long tail was black, the outer feathers being white with black tips. Its wings and back were reddish brown, the throat was dirty white running into a pinkish glow on the breast. The forehead and rump were slate coloured.

I watched the bird that first evening for an hour. Sitting on the wire he appeared to have no fear of passers-by. When anyone passed along the road he showed his annoyance by rotating his tail, at the same time making a harsh 'charr-charr' note. When things were quiet he would turn his head in all directions—in many ways I was reminded of the Little

Owl—and on seeing some insect on the ground he would dart down, glide a foot or so, and drop on the prey with his feet. At times he appeared to jump on the insect. Then he would tear it with his beak and take it back to the wire to eat.

He spent ten minutes picking insects (so far as I could see in the long grass) from off the buttercups.

The following evening the bird was there again. The evening was quiet and warm, and the bird would often break into song—a melodious twitter which lasted over five minutes on some occasions. A Blackbird was singing further down the road, and twice the Shrike made two or three notes rather like those of the Blackbird.

The following evening I took Mr. F. Taylor, of Hull, to see the bird, which was in the same place, and on the Sunday afternoon Mr. N. Hall and I spent two hours watching it.

On the Sunday the day was dull and cool, and for the first time that week I did not see the bird on the wire. We soon noticed him, however, on a low bush near the hedge, looking very dejected. He was being mobbed by two Greenfinches, two Whitethroats, and a Hedge Sparrow, and made no visible protest. Later, when searching for the Shrike's nest, I found the nests of these birds close by.

When the sun emerged the Shrike flew away across the field. This was the first long flight I had seen him make. This flight was rather like that of the Little Owl—up and down, then a glide. The long tail looked very conspicuous and the wings came to a sharp point.

He returned after ten minutes and began chasing a Whitethroat, and later a Greenfinch along the hedge. This was on the only cold day I had the bird under observation. On the warm sunny evenings he never troubled about the birds, neither did I see him mobbed.

I watched this Shrike on ten successive days and always found him approximately in the same place. Because of this and the month of the year I suspected a nest in the neighbourhood. I obtained permission from the farmer, Mr. Rook, to search the fields at one side of the road. But I had no success. On the other side of the road was Government property.

Perhaps he had no mate. Uncommon visitors must often find it difficult to find one.

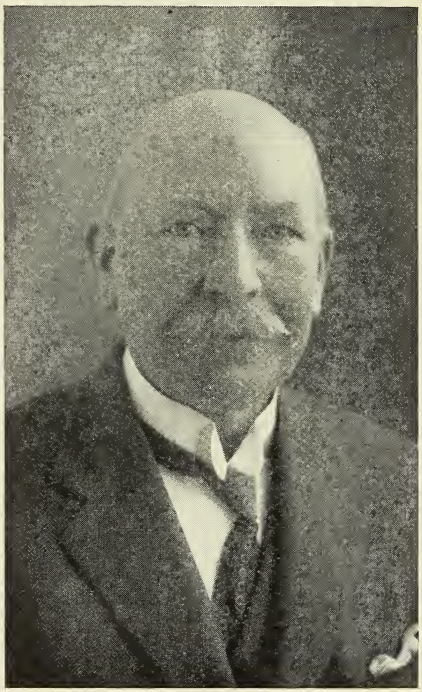
The Entomologist's Monthly Magazine for October contains 'Notes on British Collembola,' by R. S. Bagnall; 'New Species of Staphylinidæ (Col.) from Borneo,' by M. Cameron; 'Notes on Irish Siphonaptera,' by E. O'Mahony; 'The Variation in the *p*H of the Soil of the Mounds of the Ant, *Lasius flavus* F.,' by W. Pickles; 'Synonymical Notes, etc., on Formicidæ (Hym.),' by H. Donisthorpe; and several shorter notes.

In Memoriam

HARRY BLAMIRES BOOTH

1866—1941

THE complex of a man's character and personality presents many facets, and the one that it is proper to stress in this Journal happens to be that related to spare-time occupations and voluntary activities. In order to obtain a true picture of



H.B.B., it is, however, necessary to refer briefly to his business interests.

H. B. Booth was a native of Bradford, and the son of Mr. Henry Booth, a wool merchant of that city. He was educated in York, and as a young man sailed ' before the mast ' to the Antipodes, where he left his ship and lived for a time by accepting any work that came along. While working in the bush he developed an innate love of wild life which remained with him always. Here he was able to study the habits of the Marsupials, including the attractive Koala and the Kangaroo and also to make acquaintance with many species of Australian birds. Eventually, after residing some time at

King's Lynn, he returned to his native city to found the firm of H. B. Booth & Co., Ltd., in 1892, and to become one of the founders of the British Wool Federation. He was, from the first, a member of the Executive Committee of that body and for 25 years Chairman of the English Fleece Committee. He specialised in the wool of British sheep and was accepted as an authority on the history of the various breeds and on the development of the woollen trade from the earliest times.

This, then, was the background of a life which exerted a steady and continuous influence, not only on Yorkshire and British Ornithology, but on Vertebrate Zoology in general. Mr. Booth was elected a member of the Yorkshire Naturalists' Union in 1905 and successively occupied every important office within the range of his wide interests, including that of President of the Union (1921) which he graced with distinction. At the time of his death, which took place at his home in Ben Rhydding on September 18th after a short illness, he was a Referee to the editors of *The Naturalist*, Recorder for the West Riding of Yorkshire (Vertebrate Zoology), a member of the Committees for Mammals and Ornithology and Chairman of the Wild Birds and Eggs Protection Acts Committee. He was instrumental in the formation of a section for Vertebrate Zoology in 1907 and became its first Honorary Secretary, and later President. Since its formation he was certainly the most active member of this section, and an acknowledged leader. H.B.B.'s contributions to *The Naturalist* and *British Birds* were many and various, and his investigations into the status of the Great Crested Grebe in Yorkshire and into the history of the Yorkshire Heronries were complete and perfect examples of his painstaking methods. Every record was checked and counter-checked, no matter at what labour, and no assumption was accepted. He contributed a great many valuable papers to the Vertebrate section, and regularly attended Yorkshire Naturalists' Union meetings and excursions until about two years ago when he began to find it difficult to get about, and came to rely on his very considerable gift for correspondence. He was also a generous contributor to the funds of the Union.

Possessed of a most retentive memory and of great physical and mental activity, Mr. Booth came to know the immense County of Yorkshire and its vertebrate population most intimately ; every village and hamlet, every unusual haunt was known to him, and his profound knowledge was given freely to others. Whether one required particulars of the nesting status of the Dunlin in North Yorkshire or of the distribution of the Palmated Newt in the East Riding it was all the same to him, and his observations were backed up by copious notes. His main interest lay in the vertebrate fauna

of the British Isles, and he was delighted to visit Texel and other western European Islands in order to study those species that at one time nested or bred in Great Britain.

H.B.B. was a Fellow of the Zoological Society, a Member of the British Ornithological Union and a pillar of strength to the Bradford Naturalists' Society. He did everything possible, sparing neither labour nor expense, to preserve the vertebrate fauna of Yorkshire unimpaired for a more enlightened generation and to discourage the taking of eggs and the unauthorised collecting of specimens. He was, in short, one of a remarkable group of naturalists that made *Nelson's Birds of Yorkshire* possible, and his loss will be keenly felt both as a warm-hearted friend and a true lover of Nature. He leaves behind him a widow, a son and daughter and very many friends and admirers.

E. Wilfred Taylor.

ROBERT J. FLINTOFF.

We regret to record the death of Mr. R. J. Flintoff, of Water Ark Lodge, Goathland, Yorks. Mr. Flintoff, a frequent contributor to this and other journals dealing with natural history, was widely known as a keen naturalist. He was originally engaged in the chemical industry, from which he retired more than twenty years ago. He was trained at Owen's College, Manchester, and was a Fellow of the Chemical Society. After his retirement, he devoted himself primarily to taxonomic botany, but he was also a keen student of bird life. He was for long a Fellow of the Linnean Society.

Mr. Flintoff was a man of vigorous personality and strong opinions. He believed that a naturalists' work lay primarily in the field and that it was his duty to record his observation for the benefit of others. Hence he devoted much time and energy to promoting field studies and to getting them recorded. Of late his life had been saddened by his own inability, with advancing years, to continue field work. Nevertheless, he has helped and influenced many, both young and old, in his chosen sphere and natural history will be left the poorer by his passing.

W. H. P.

CORRECTION

Page 251, third line from bottom 'Glow-worm' should have been 'Slow-worm.'

RECORDS

THE CONVOLVULUS HAWK MOTH, *SPHINX CONVOLVULI*

A SPECIMEN of this fine insect was found in a greenhouse at Blackwell, Darlington, at the end of August ; it was brought to me in fairly good condition.—JOHN E. NOWERS.

LAPWING WITH UNUSUAL PLUMAGE

WHILE watching birds on the mud at Gowthwaite Reservoir on July 27th this year I noticed a Lapwing with a very considerable amount of white in its plumage, and kept it under observation through field glasses at intervals for about an hour. My notes made at the time state that the gorget, wing tips, a ring round the neck, and a band at the end of the tail were dark, and the under tail coverts were reddish brown, and the remainder of the plumage white. The white was not a pure white, but just off white, rather like the plumage of a not-too-clean white barnyard fowl. It was feeding in company with a small flock of normally coloured Lapwings, and its feathers appeared more flimsy than theirs ; when it ran or stood with the wind behind it, the wind seemed to ruffle its plumage more than that of the others. The dark wing tips were only noticeable when it raised its wings to stretch them and when in flight. I mentioned the matter to my friend, Mr. Nelson Bell, head keeper at Middlesmoor, a few miles further up the valley, and on September 2nd heard that he had seen the bird, and that by the end of August it had left the vicinity of the reservoir and that he had last seen it with a flock of twelve others near Ruscoe Beck, about a mile north-east of Middlesmoor.—W. F. FEARNLEY.

[Partial albinism in this species is unusual but not unique. A very similar Lapwing occurred some years ago in North Lancashire and was photographed sitting on eggs by T. Robinson.—R.C.]

PEUCEDANUM PALUSTRE AT SOWERBY BRIDGE

DURING August I received from Mr. H. Walsh, of Luddenden Foot a number of plants for identification and confirmation, among which were specimens of the above, correctly named by the finder. The occurrence of this very local species in the Calder Valley was so unexpected that I at once arranged a meeting with Mr. Walsh to see it *in situ*. A dozen or more well-grown and fruiting plants were seen on the canal side in Sowerby Bridge, and at intervals along the canal towards Halifax nearly as far as Copley, a distance of about two miles. The portion of the canal in Sowerby Bridge where the main patch of plants grows (and from which the other plants have

almost certainly been derived) is no longer in use, and the *Peucedanum* was growing in a marginal reed bed of *Glyceria aquatica*. Some small gardens were situated at the top of the bank above the plants. On enquiry the owner had previously informed Mr. Walsh that the *Peucedanum* had been growing in its present position throughout his twenty years' residence there. Probably no great reliance can be placed on his ability to distinguish this plant from other large Umbelliferous species, but the enquiry at least showed that the owner of the garden was not responsible for its introduction ; indeed, it is so very unlikely a plant to be grown in any garden in the district that its origin in that way may be discounted. No alternative suggestion, however, can be put forward to account for the origin of this plant, the fruits of which are not, to my knowledge, sought after by birds, and certainly not suited for wind dispersal.—W. A. Sledge.

REVIEW

The Handbook of British Birds, Volume V, by H. F. Witherby, Editor, (F. C. R. Jourdain, N. F. Ticehurst and B. W. Tucker, pp. xii+356, with 22 plates, text figures and maps, 25/-, or the five volumes for £5/5/-. Congratulations of all naturalists, and particularly birdmen, must go out to Mr. Witherby and his collaborators for the completion of the monumental work commenced in 1935. It is evident that much foresight has been exercised to allow of the publication in 1941 of a volume in which paper, printing, illustrations and binding are quite up to the standard of the four pre-war sections of this work. This last section is devoted to Terns, Gulls, Guillemots, etc., and the Game Birds. It is particularly gratifying to have such a complete series of coloured plates depicting male, female, both adult and juvenile, and there are some valuable illustrations of nestlings. Some ornithologists may have felt slight disappointment at what they may have regarded as inadequate treatment of their own particular section of bird-study. We agree with the Editor of the volumes that unless the work was to be expanded enormously, such matters as sexual and social behaviour, nest sanitation, territory and so on could only be dealt with in outline, while at the same time copious indications are given as to the manner in which the many gaps in our knowledge may be filled up. It is to the credit of all concerned that throughout the five volumes, emphasis has been laid on these gaps. The older works on British Birds usually leave one with the impression that their writers thought that nearly everything possible had been said. For many excellent reasons the Handbook is likely to be the standard work on its subject for long years to come.

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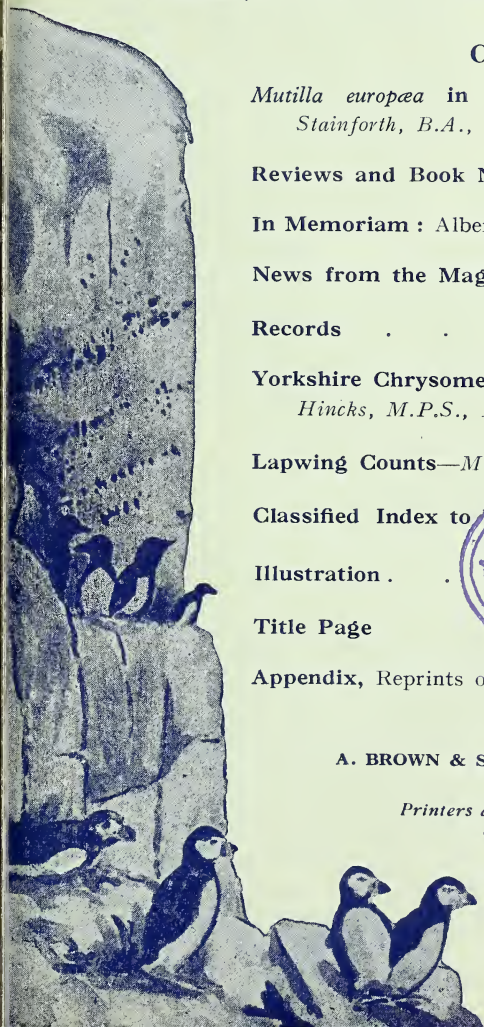

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MUTILLA EUROPÆA IN YORKSHIRE

Discovery of the Male.

T. STAINFORTH, B.A., B.Sc. (LOND.)

AMONG our Yorkshire insects are some, that by reason of their beauty, remarkable habits, or peculiarity of distribution, arouse interest in both expert and layman. Not least of these is the Solitary Ant, *Mutilla europæa*, whose richly-hued velvety covering, dependence on a *Bombus* host, and limitation in distribution to the high northern moorland, as far as Yorkshire is in question, are the focus, respectively, of this trinity of interests.

Since the first published record of it as a constituent of

Photo by] [*R. M. Stainforth*

♂ **Lockton Low Moor** ♀ **Stoupe Brow** ♂ **Howdale Moor**

Twice natural size

the fauna of the North Yorkshire moors by the late Rev. W. C. Hey, in 1903, many further examples, all, like the first, females, have been discovered and recorded. Most of these are duly listed in Butterfield and Fordham's admirable account of the 'Aculeate Hymenoptera of Yorkshire.' Since the section on *Mutilla* was published (1930), further examples have been discovered, including, so far as my knowledge goes, the first Yorkshire males.

The first male was discovered on July 26th, 1933, by my son as it rested in the sunshine on a pathway on Lockton Low Moor, not far from the High Bride Stones. Later in the same year, on August 22nd, while tearing up the dried algal felt in a hollow on the Howdale Moor near Ravenscar, in search of Coleoptera, Mr. Hugh Taylor and the writer disturbed two further males which, in spite of their activity, we were fortunate enough to capture. One of this pair of specimens is now in the collection of Mr. G. B. Walsh, while the other, with the first record, is in that of the writer. On August 22nd, 1938, I found a fourth male resting in the bright sunshine on a piece of rock, near the footpath above the

 JAN 14 1942

brickworks at Ravenscar. The following is a list of specimens of *Mutilla* captured either by the writer, members of his family, or friends, and not referred to in the list of Butterfield and Fordham, or elsewhere :

1 ♀. Road to Stoupe Brow, Ravenscar (T.S.). 6/8/29.
1 ♀. Road to Stoupe Brow (Mrs. Wilfrid Taylor). 13/8/30.
1 ♀. Road, Stoupe Brow to Howdale (T.S.). 18/8/30.
1 ♀. Road, Stoupe Brow to Howdale (R. M. Stainforth). 24/8/30
1 ♀. Road, Stoupe Brow to Howdale (T.S.). 26/8/30.
1 ♂. Path on Lockton Low Moor (R. M. Stainforth). 26/7/33.
1 ♀. Staintondale Moor (T.S.). 14/8/33.
1 ♀. Staintondale Moor (Mrs. E. J. Chaplin). 17/8/33.
2 ♂♂. Howdale Moor (T.S. and Hugh Taylor). 22/8/33.
1 ♀. Howdale Moor (T.S.). 22/8/32.
2 ♀♀. Staintondale Moor (T.S.). 25/8/33.
3 ♀♀. Path above brickworks, Ravenscar (T.S.). 20/8/38.
1 ♂, 2 ♀♀. Path above brickworks, Ravenscar (T.S.). 22/8/38.
1 ♀. Half a mile north of the cross-roads near Little Fryup, Danby Moor (J. E. Fearey). 4/9/38.
1 ♀. On the Moors near Castleton (Mrs. Wilfrid Taylor). -/8/39.

For the sake of completeness, I list below in chronological order of capture, so far as can be ascertained, previously recorded Yorkshire examples of *Mutilla europæa* :

1 ♀. A specimen with no locality label attached in Whitby Museum.
1 ♀. Ebberstone South Moor (W. Pearson). 9/9/01. This is apparently the first capture in Yorkshire, but was not recorded until 1921 (by G. B. Walsh).
1 ♀. ' Moors near Scarborough ' (W. C. Hey). ' Summer,' 1903.
1 ♀. On the summit of Brown Rigg, moors near Robin Hoods Bay (F. Elgee). 1/8/04.
1 ♀. ' Moors above Peak Alum Quarries ' (W. J. Fordham). -/8/05.
1 ♀. Hutton Buscel Moor (W. C. Hey). -/-/08.
1 ♀. ' Low Moor, between Scarborough and Robin Hood's Bay ' (Prof. A. G. Green). -/9/13.
1 ♀. Keys Beck, Goathland (I. L. Rowland). -/5/18.
1 ♀. Esk Rigg, opposite Keys Beck House. (In Whitby Museum.) 2/6/18.
2 ♀♀. ' Moor near the head waters of the River Derwent.' 22/6/18.
1 ♀ (?) (Another specimen found here years ago.) (J. T. Sewell.)
1 ♀. Ravenscar (W. J. Fordham). 1/9/20.
1 ♀. Lilla Cross, Whitby (E. A. Wallis). 17/6/21.
2 ♀♀. Ravenscar (T.S.). 4/8/27.
1 ♀. Glaisdale (Mr. Gidman). 12/8/36.

It will be seen from the first capture in 1901, to the last in 1939, the list includes 38 examples, 4 of which only are males. Of those for which the date of finding is ascertainable, 1 is recorded for May, 4 for June, 1 for July, 24 for August, and 4 for September. It would seem that August is the best time to look for it, but it must be borne in mind that the peak of number of captures coincides with the peak of the holiday season. Nevertheless, the average is about 1 per annum, so that the species can scarcely be said to suffer from over collecting. Other captures have doubtless been made,

and it would be of interest if these could be put on record, so that as complete a Yorkshire census of *Mutilla* as possible be compiled.

The problem of the distribution of *Mutilla*, and the possibility of it being a glacial survivor in the moorland area of North Yorkshire, has been ably and judicially considered by Elgee. The statement is frequently repeated that, until North Yorkshire is reached, its northernmost limit is Colchester in Essex. Elgee points out, however, that Bold recorded it, in 1855, as being taken occasionally on the sand hills near South Shields (Durham). Evidently the reference in Kirby and Spence's *Introduction to Entomology* (Vol. II, p. 392) has also been overlooked. Here, one of the authors, presumably Kirby, who lived at Barham, near Ipswich, writes : '*Mutilla europæa*, a hymenopterous insect, makes a sibilant chirping, as I once observed at Southwold, where it abounds.' Southwold on the Suffolk coast is distinctly north of Colchester. In the *Life of the Rev. William Kirby, M.A., F.R.S., F.L.S., etc., Rector of Barham,*' by John Freeman, 1852, is a letter (p. 408) from Kirby to J. C. Dale, written from Barham, September 20th, 1823, in which occur the words ' I took the other day a male specimen of *Mutilla europæa*, which is a scarce insect.' The context would lead one to infer that the example had been caught near Barham, though it might have been Harwich, since in the same letter he states he had been staying there. Evidently *Mutilla* was to be obtained in Suffolk a century or more ago.

Both sexes of *Mutilla* can produce sound, a fact noted so long ago as 1791, and I have myself on several occasions observed the squeaking sound produced by the female when held between the fingers, though I did not notice it in the case of the male, possibly through the natural excitement of the capture of an insect *tam rarum et diu desideratum*. The sound is produced by rubbing together the tergites (dorsal plates) of the second and third abdominal segments. Beneath the former is a sharp ridge which rubs over a series of striæ on the upper front edge of the latter.

Mutilla europæa was to be found in Hyde Park in the late eighteenth century. Barbut found about 20 examples when in pursuit of insects there, in 1781, by turning up moss. It has a wide distribution, a variety of it (*mikado*), differing only in slight details of punctuation, being found in Japan.

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REVIEWS AND BOOK NOTICES

Cine-Biology, by **J. V. Durden, Mary Field,** and **F. Percy Smith**, pp. 128 with 119 photogravure illustrations. A ' Pelican ' Book, A.85, 6d. Here is another miracle of cheapness from the ' Penguin ' publishers. The three competent collaborators in this readable little book discuss some aspects of biology from cell-structure to the development and life-histories of insects. The many illustrations which are clear and to the point are from the famous G-B Instructional Films.

World of Birds, by **Eric Parker**, pp. viii+295. Mr. Parker is always worth reading. He is a life-long and trained observer, and therefore, as one might expect, his writings have that freshness and convincing power which comes only of first-hand knowledge. Mr. Parker returns once more to the ' drumming ' of Snipe and the tapping of the Woodpecker. These questions are discussed dispassionately and with copious notes of evidence from many reliable sources. Several naturalists including the late James Green, of Thornton Dale, give detailed accounts of Snipe drumming when on the ground. A soft-wood tree on which a Woodpecker had drummed loudly many times bore no beak marks. All this suggests the need for further close research and perhaps good slow-motion cinematography might well be employed. Woodpecker tapping might be imitated by an electric buzzer arrangement with an actual Woodpecker beak attached.

The Open Book of Wild Life, by **Richard Morse**, pp. 240, with 16 colour plates, 50 photographs, and 50 drawings in the text. Black, 8/6. This is a good introduction to the study of natural history. It combines accuracy with readableness and is altogether a most attractive book. It would serve as an ideal present for a young naturalist. The two parts of the book deal with the animal and plant kingdoms respectively. There is a foreword by David Seth-Smith, the ' Zoo Man ' of the B.B.C.

The Naturalist

In Memoriam

ALBERT HIRST

1865—1941

By the death of Mr. Albert Hirst, of Huddersfield, in October last, the Union, as well as his native town, have to deplore the loss of a typical English gentleman and an enthusiastic ornithologist and naturalist. He was a devoted lover of nature, especially of bird life. He possessed an excellent private aviary, varieties of Budgerigar in particular being an outstanding feature thereof. The aviary at the Tolson Memorial Museum, Huddersfield, was provided and stocked entirely at his own expense, and this will remain as a permanent memorial to his memory, and as one of the many tokens of generosity to his native town. Of a most kindly disposition, devoid of ostentation, he readily endeared himself to fellow students who likewise derived immense happiness from the simple and varied beauties of the natural world. The writer speaks from experience of his friendship and charming character and his natural studies, and especially recalls happy hours in his company on the Speeton Cliffs during the breeding season of our seabirds. Mr. Hirst was elected a member of the Union in 1922 and was a member of the Committee of Ornithology. He served with distinction as one of the past Chairmen of the Wild Birds and Eggs Protection Committee, his election to that office being very gratifying to him. He was also a member of the Huddersfield Naturalist, Photographic and Archæological Society, and oftimes contributed exhibits at the annual exhibitions of this society. He was also a great lover of music. His civic work was outstanding. He became a member of the Huddersfield County Borough Council in 1920, was Mayor from 1933 to 1935, and an Alderman for six years until his retirement in 1939. His devotion to his civic duties prominently displayed his many abilities, and the sincerity of his character, and justly earned the public esteem. He was a Director of Messrs. C. & J. Hirst, Ltd., Woollen Manufacturers, Longwood, and also a Freemason. Unfortunately ill-health compelled him in 1939 to relinquish his civic work on the County Borough Council, and although making a partial recovery he had a further seizure and his health steadily declined. The esteem in which he was held was revealed by the representative gathering of all classes of the community who attended his funeral. W. E. L. W.

The Entomologist for November contains ' A Change of Name and a Key to the British Species of Cartodere (Coleoptera, Lathrididæ),' by H. E. Hinton ; ' Changes in Nomenclature affecting Malayan Hesperidæ (Lepidoptera),' by W. H. Evans ; ' The Insect Fauna of the Isle of Eigg,' by D. K. McE. Kevan ; ' On Rearing Lepidoptera,' by F. Littlewood ; and numerous shorter notes and observations.

RECORDS

PURPLE EMPEROR BUTTERFLY

On September 22nd, while on reconnaissance duty, I was waiting at the edge of a glade in a large area covered with scattered Oak trees on the side of the valley at Ewden Head. The day was sunny and warm, and I was watching five Mallard which were circling around, evidently having been disturbed. Suddenly there appeared to drop from the sky a large butterfly of arresting appearance. It settled on a bracken frond, and I cautiously got nearer, being careful to avoid casting a shadow over it. Hastily I wrote down notes of its colouring, etc. In size it was larger than a Red Admiral. The upper surface of the wings gave a strong purple sheen, varying with the light and the angle of the wings ; there was a white bar from near the centre of the front wing to near the lower angle of the hind wing, and small cross bars of white near the forward corner of the front wing, rather like those on the Red Admiral. There was a small eye spot near the lower angle of the hind wing. The wings appeared margined with a lighter shade. All wings were very strongly veined. On the underside there was the same white bar, but slightly broader ; this was patterned around with orange brown, some grey brown and a little black. On the front wing was a purple-centred eye spot, and a smaller one near the lower angle of the hind wing. The body was of a purplish hue.

After a period of rest, during which it kept opening and closing its wings, it flew off, mounting rapidly high in the air.

On arrival back in Sheffield I made an examination of all the butterfly books in the library and managed to get a look at a mounted specimen. These investigations confirmed my opinion as to species. The point where the observations were made is four and a half miles within the Yorkshire boundary. —J. P. Utley.

DESTRUCTION OF WILD LIFE DURING THE WAR.

In the *Farmers Weekly* for November 7th, 1941, appears the following paragraph : ' More than 60,000 farm pests have been destroyed by Inverness-shire (Mainland) Agricultural Executive Committee, in co-operation with owners and tenants since the outbreak of war. The death roll includes 6,875 pigeons, 362 foxes, 552 fox cubs, 1,608 hooded crows, 31,658 mountain hares, and 7,542 ravens, hawks, black-headed gulls, badgers, otters, etc.' ' It is estimated also that 5,000 rabbits and 1,000 moles have also been killed ; in addition, about 7,000 deer have been accounted for each season.'— W. J. C.

YORKSHIRE CHRYSOMELIDAE (COL.) IN 1941.

W. D. HINCKS, M.P.S., F.R.E.S.

In collecting for special work during the past season I have been interested in noting the occurrence of Chrysomelid beetles. A list is given below of the species met with. With the exception of Skipwith and Kelfield nearly all the localities visited were country lanes near Leeds, and this accounts for some of the obvious lacunæ in my list. Most of the material was swept from roadside vegetation, and the presence of the various species was of course determined by the plant species composing the hedgeside flora. This was comparatively uniform over most of the Leeds localities worked, and interesting beetles occurred only here and there where less generally distributed plants cropped up as, for instance, *Aphthona pallida nigriceps* on *Geranium pratense*.

Notes on the more interesting species follow the list.

I am indebted to Dr. W. J. Fordham for information regarding records.

List of Localities

1 ... ... Thorner, near Leeds, 13/4 (V.C. 64).
2 ... ... Ilkley, 14/4 (V.C. 64).
3 ... ... Shadwell, near Leeds, 28/5 (V.C. 64).
4 ... ... Roundhay Park, Leeds, 28/5 (V.C. 64).
5 ... ... Skipwith Common, 2/6 (V.C. 61).
6 ... ... Harewood District, 3/6 (V.C. 64).
7 ... ... Wike, near Leeds, 4/6 (V.C. 64).
8 ... ... Kelfield, 9/6 (V.C. 61).
9 ... ... Shadwell, near Leeds, 11/6.
10 ... ... Shadwell, near Leeds, 18/6.
11 ... ... Aberford, 21/6 (V.C. 64).
12 ... ... Hook Moor, 21/6 (V.C. 64).
13 ... ... Shadwell, near Leeds, 25/6.
14 ... ... Wike, near Leeds, 9/7.
15 ... ... Harewood District, 19/7.
16 ... ... Wike, near Leeds, 19/7.
17 ... ... Huby District, 21/7 (V.C. 64).
18 ... ... Sicklinghall, 23/7 (V.C. 64).
19 ... ... Walshford Bridge District, 4/8 (V.C. 64).
20 ... ... Walshford Bridge District, 5/8.
21 ... ... Little Ribston District, 5/8 (V.C. 64).
22 ... ... Roundhay Park, Leeds, 28/8.
23 ... ... Harewood District, 6/9.
24 ... ... Skipwith Common, 13/9.
25 ... ... Deffer Woods, 27/9 (V.C. 63).
26 ... ... Cawthorne Woods, 28/9 (V.C. 63).
27 ... ... Bretton Hall Park, 29/9 (V.C. 63).
28 ... ... High Wood, Cawthorne, 30/9 (V.C. 63).
29 ... ... Cawthorne Woods, 1/10.

LIST OF SPECIES

Chrysomelidæ

Donaciinæ

Donacia simplex F. and *ab. sanguinea* Westh. 18.

CRIOCERINÆ

Lema melanopa L. 5, 6, 7, 8, 12, 23, 24.

CRYPTOCEPHALINÆ

Cryptocephalus pusillus F. 24.

CHRYSOMELINÆ

Chrysolina staphlea L. 7, on *Urtica dioica*.
C. graminis L. 8 ! ! on *Tanacetum vulgare* (*V.C. 61).
C. polita L. 24 on *Mentha*, 26.
Gastroidea polygoni L. 3, 4, 5, 6, 8, 9, 16 on *Polygonum*.
G. viridula Deg. 8 ! ! on *Rumex*.
Phædon cochleariæ F. 8.
P. tumidulus Grm. 2, 8, 12, 20.
Hydrothassa marginella L. 8, 11.
Chrysomela populi L. 5.
Phyllodecta vitellinæ L. 5, 6, 7, 8, 11, 17, 22, 25.

GALERUCINÆ

Galerucella grisescens Joann. 24 ! ! on *Polygonum amphibium*, 27 on *P. persicaria*.
G. tenella L. 8, 24.
Galeruca tanaceti L. 23 on *Scabiosa arvensis*, 24 on *S. succisa*.
Lochmæa suturalis Th. 24 on *Erica*.
Sermylassa halensis L. 24 ! ! on *Galium*, etc.

HALTICINÆ

Phyllotreta nemorum L. 1, 6, 7, 8, 9, 11, 20, 21.
P. undulata Kts. 1, 6, 7, 8, 9, 11, 12, 28.
P. flexuosa Ill. 6.
P. atra F. 9 (*V.C. 64).
Aphthona pallida nigriceps Rdt. 19, 20, on *Geranium pratense*.
A. venustula Kts. 7, 9 (Thorner, 13/5/39, *V.C. 64).
Longitarsus ochroleucus Msh. 15 (*V.C. 64).
L. jacobææ Wath. 18, 20.
L. succineus Fdr. 21 (*V.C. 64).
L. melanocephalus Deg. 5, 6, 11.
L. suturellus Dft. 1, 5, 6, 8, 9, 11, 18.
L. luridus Scop. 11, 18, 20, 21, 23, 24, 25, 26, 27.
Haltica britteni Shp. 24, on *Erica*.
H. oleracea L. 6, 8, 9, 24 on *Epilobium*, many examples, all females.
Batophila rubi Pk. 12, on *Rubus idæus*.
Crepidodera ferruginea Scop. 18, 19, 20, 24.
C. transversa Msh. 24.
Derocrepis rufipes L. 11 on *Vicia*.
Chalcoides fulvicornis F. 5, 7, 8, 11, 17.
Mantura rustica L. 7, 8, 20 on *Rumex*.
Chætocnema concinna Msh. 1, 3, 5, 6, 7, 8, 20, 21, 24, 25, 27, 29.
C. hortensis Gf. 24 (*V.C. 61).
Apteropeda orbiculata Msh. 25, on *Teucrium scorodonia*.
Hippuriphila modeeri L. 24, on *Equisetum*.
Sphæroderma testaceum L. 12.
Psylliodes affinis Pk. 8, 24, 25, on *Solanum dulcamara*.
P. picina Msh. 8.

CASSIDINÆ

Cassida viridis L. 24, on *Mentha*.
C. rubiginosa Ml. 12, 16, 24, On Thistles.

Chrysomelinæ

Chrysolina graminis L. This beautiful insect was abundant on Tansy at Kelfield in early June on the banks of the River Ouse. Females were laying the first clusters of yellow eggs on the food-plant. Previous Yorkshire records are Clifton Ings at York, Wakefield, and Doncaster, and the species reaches as far as Cumberland, but is always very local. Mr. Stainforth (*Nat.*, 1941, 248) records it from the same locality during the Y.N.U. meeting to Cawood and notes the presence of larvæ. In Wicken Fen (Cambs.) *Mentha* is the food-plant of this species.

Halticinæ

Halticine Variation. Heikertinger, the leading authority on the European Halticines, has proposed* a useful means of recording the variation of these insects. He indicates the different variates by a Latin ' codeword ' of one or two words which is preceded by the term ' forma ' (f.). Thus *Mantura rustica* (Linn.) is known to vary from the typical (f. flavoapicalis) which has dark elytra with a large yellowish apex to the f. flavipennis (suturata) in which the elytra are light coloured with a dark suture. The latter is recorded as var. *suturalis* Ws. in British lists. It should be noted, and this is important, that these descriptive terms are not names and are not therefore subject to nomenclatoral rules.

Until much more is known regarding the genetics of Halticine variation it is much better to indicate it along these lines than to name every divergence from the typical.

Phyllotreta flexuosa (Illig.). Previous Yorkshire records are Filey (Horrell), Sherburn, near Scarborough (Walsh), and Harewood (Caird). The specimen on which the Filey record is based is in my collection and was named by Horrell as *P. nemorum* var.? It was submitted to W. E. Sharp who pronounced it to be *P. flexuosa*. It is certainly merely a dark *nemorum* and the Filey record should therefore be deleted.

P. atra (Fab.). Recorded from three localities in V.C. 62 and from Sheffield.

Aphthona pallida (Bach). The following summarises the variation and distribution of this species and its subspecies, including the British ssp. *nigricans*.

Aphthona pallida (Bach, 1856). f. atriceps, pallidiceps, flavipennis (concolor), angustesuturata, latesuturata.

pallida pallida (Bach.). f. atriceps flavipennis (concolor). Central Europe, north to Thuringia, Silesia, and Poland, west to Alsace.

ab. *geranii* Ws. 1891. f. atriceps angustesuturata.

pallida nigriceps (Redt. 1842). f. atriceps angustesuturata. Mediterranean coasts of Europe and North Africa, north to England, France, N. Italy, Jugo-Slavia, Bulgaria, east to Greece, Aegean Is., Crete, Caucasus.

ab. *decorata* Kutsch. 1861. f. atriceps latesuturata.

pallida maculata All. 1876. f. pallidiceps angustesuturata. Asia-Minor, Caucasus, Syria, Palestine, and Turkestan.

Nigricans has twice been recorded in the county by Carter at Grassington and Addingham. It is very local and is known in this country from a limited number of localities extending, however, as far north as

* Heikertinger in: *Ent. Blätter*, **19**, 1923, 18, *Koleopt.* (not seen); *Rundsch.* **15**, 1929 (not seen); in *Winkler, Cat. Coleopt. reg. palæarct*, 1930, 1317. In Heikertinger and Csiki, *Coleopt. Cat.*, pars 166, 1939 (Chrysomelidæ, Halticinæ I), the old method is reverted to owing to the fact that only European forms have been examined on the lines laid down by Heikertinger.

Kirkcaldy. I took 43 specimens in two series of sweeps at spots about half a mile apart on the Cowthorpe lane east of the Boroughbridge road just south of Walshford Bridge. Although I worked the *Geranium pratense* for a mile along this lane I only found the beetle in two very small areas. On the west of the main road along the Little Ribston lane, although good patches of the food-plant were searched no specimens were found.

This series is variable and contains combinations of the following variates : f. atriceps, angustesuturata, latesuturata, brachyptera, macroptera. The following are the combinations and their percentages in this series :

(1) angustesuturata brachyptera 40%
(2) angustesuturata macroptera 0%
(3) latesuturata brachyptera 48%
(4) latesuturata macroptera 12%

The individual variates are dispersed as follows : atriceps, 100% ; angustesuturata, 40% ; latesuturata, 60% ; brachyptera, 88% ; macroptera, 12%. In the literature I have available I cannot find any reference to the condition of the wings in *pallida* or *nigricans*. Yet 88%, as examined through the transparent elytra, have wings which do not cover the hind body. A number of these have the organs reduced to small flaps. Of the 12% which appear to have full length wings probably only a single specimen (2%) has them in a fully functional condition. The 26 specimens in my collection from various European localities have the elytra opaque and the wings are therefore not observable without dissection, but all are probably fully winged.

Aphthona venustula Kutsch. 1861. This is recorded in the county from York only, the vice-county not being stated. I first took it at Thorner on the thirteenth of May, 1939, and this is therefore the first record for V.C. 64. This year it occurred at Wike and Shadwell in June. All three stations are within a short distance of each other. These three specimens are the typical f. picifemorata.

Mantura rustica (Linn.). This is a common species on *Rumex* and, as mentioned above, has typically a large ferrugineous area at the apex of the elytra (f. flavoapicalis). An uncommon light coloured variant (f. flavipennis (suturata)) has the elytra extensively pale with a dark suture. At Kelfield I took a single example of a melanistic form apparently unrecorded (f. nigripennis (concolor)). The elytra are dark, nearly black, with hardly a trace of the lighter apical markings. The antennæ and legs too are piceous.

LAPWING COUNTS

M. U. LORD AND J. LORD

COUNTS of breeding lapwings have been carried out over a period of years in an area of the Esk valley in the North Riding. The area lies between Danby and Lealholm, and covers rather more than three and a half square miles. About half the area is under the plough, the rest being pasture. It is sparsely wooded and flanked by hill pastures and low moorland. The counts could not always be carried out at exactly the same times of the year, but were nearly all taken in late March or early April. The dates given are central dates in the counting periods which sometimes took several days.

The hill pasture and moorland breeding population was not counted but appeared to be roughly rather less than half that of the valley. In the latter region the most favoured sites are somewhat damp pastures, often with a few scattered tufts of rushes, and ploughed fields. Nests are almost always away from the field boundaries and in as commanding a position as conditions allow. The steeper of the hillside pastures are rarely used, and on the moorland bare peaty ground or ground covered with dead bracken is used for the nesting site. In one case the same site, to within a yard,

Year	Date	Birds per sq. mile	Non-breeding Flocks No. of Birds	August Flocks
1931	April 8th	73	Nil	Small
1932	Mar. 28th	127	30	Small
1933	April 15th	84	28	Scattered pairs
1934	April 1st	83	(i) 15 (ii) 14	—
1935	April 21st	77	Nil	Large
1936	April 14th	128	Nil	—
1937	Mar. 30th	90	(i) 45 (ii) 20	Medium
1938	April 16th	126	Nil	Large
1939	April 3rd	138	Nil	Small
1940	April 1st	80	16	Medium
1941	May 26th	86	Nil	Small

was utilised in a moorland ' intake,' for at least six successive years, 1928-1933.

It was noted that small flocks of non-breeding birds were in the area on all occasions when the count occurred at the end of March or during the first week in April, except for the 1939 count. The resident birds were then breeding. These flocks were not noted later in the Spring except on one occasion (1933), although one of the groups noted in 1934 was still present on April 15th. These birds are never seen on the moorland or hill pastures bordering the area but always in the fields around the river. They are not included in the normal counts but tabulated separately.

Flocks can be observed again from about the middle of June, *e.g.* 1940 (flocks of thirty and twelve) and throughout the Autumn. At this time they may be seen on the moorland and hill pastures too. Numbers in the flocks rarely exceed eighty to a hundred. A few August observations are included in the table although systematic counting was not attempted.

[The August flocks would be British, probably mainly local birds. The passage migrants of early spring may have been Baltic, Danish or Dutch birds. One ringed Lapwing recovered in Yorkshire came from Texel—well known to some Yorkshire naturalists in more peaceful times.—R. C.]

1 Dec. 1941

CLASSIFIED INDEX

COMPILED BY W. E. L. WATTAM

It is not an index in the strictest sense of that term, but it is a classified summary of the contents of the volume, arranged so as to be of assistance to active scientific investigators ; the actual titles of the papers not always being regarded so much as the essential nature of their contents.

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CORRIGENDA

Page 254, line 23, *for* ' *Puvlication* ' *read* ' *Publication*.'
,, 266, ,, 10 from bottom of page, *for* ' *Dexhampsia* ' *read* ' *Deschampsia*.'
,, 266, ,, 5 from bottom of page, *for* ' Lee's ' *read* ' Lees'.'
,, 267, ,, 8, *for* ' Dr. J. P. R.' *read* ' Dr. S. P. R.'
,, 267, ,, 11, *for* ' South-west ' *read* ' south-west.'
,, 268, ,, 4, *for* ' worked ' *read* ' warped.'
,, 268, ,, 9, *for* ' *Drosua* ' *read* ' *Drosera*.'
,, 268, ,, 31, *for* ' *Dorscea* ' *read* ' *Drosera*.'
,, 268, ,, 37, *for* ' most ' *read* ' some.'

CIRCULAR No. 430

Yorkshire Naturalists' Union.

President:
H. C. VERSEY, D.Sc., F.G.S., The University, Leeds.

Hon. Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds.

Divisional Secretary:
Dr. J. GRAINGER, B.Sc., Tolson Museum, Huddersfield.

The 430th Meeting

WILL BE HELD AT

ROCHE ABBEY

V.C. 63

On Saturday, MAY 17th, 1941.

HEADQUARTERS.—The Lodge, Roche Abbey (Mrs. Powell), where tea will be available at 4-30 p.m.

TRAVEL FACILITIES.—By Maltby bus from College Square, Rotherham, at 9-15 a.m. and every 15 minutes until 12 noon, after which every 6 minutes (time taken, about ½ hour). A bus direct from Sheffield to Maltby runs hourly, leaving at 15 minutes past the hour. By bus from Waterdale, Doncaster, every hour from 9-15 a.m.

The morning party will leave the Maltby bus terminus at 11-15 a.m., where guides will be available for alternative routes to Roche Abbey, (*a*) *via* 'The Norwoods,' (*b*) *via* Maltby Common. Anyone arriving late should proceed through the Norwoods. Car owners should make for the Maltby bus terminus and possibly, if car accommodation is available, members may prefer to go direct to the Abbey and start thence, where leaders will be available at 11-30.

Permission to visit the Roche Abbey Woods has been kindly granted by Mr. W. Dawson, agent for Lord Scarborough.

MAPS.—The area is included on the Ordnance Survey 6" Plan, No. 296 N.E.

THE DISTRICT.—The old Cistercian Abbey is now in charge of the Office of Works, and admittance to the enclosure can be had on application at the Lodge. The site, below craggs of magnesian limestone, with stream and fishpond, is typical. All the hills surrounding the vale are wooded.

VERTEBRATE ZOOLOGY.—Mr. Ralph Chislett writes: Woodland species of birds abound. Warblers will be represented by all three Phylloscopi, and by Blackcap, Garden Warbler, Whitethroat, and Sedge Warbler. Titmice are numerous and include the Willow-tit. The Goldcrest was very scarce in 1940 after the frosts, but previously had been a regular breeder in the many yews; it will be interesting to look for signs of recovery. The Creeper breeds commonly, and the Nuthatch should be heard. Great-spotted Woodpeckers are not uncommon and the other two Woodpeckers are a possibility. Breeding Owls include the Barn, Tawny, and Little Owl.

Nests of Woodcock were found in 1938 and 1939. Other species nesting include Bullfinch, Redstart, Spotted Flycatcher, Stockdove, and numerous Jackdaws. Red Squirrels were formerly common but are seldom now seen. Moles, Hedgehogs, and Water Voles are numerous, but little is known of the status of the smaller mammals. Grass Snakes and Slow Worms occur, and the usual amphibia.

ENTOMOLOGY.—Mr. G. E. Hyde, of Doncaster, writes : The Roche Abbey district is an interesting one for the entomologist. As in most parts of South Yorkshire, butterflies are less numerous than moths. *Gonepteryx rhamni* is found sparingly, and *Argynnis aglaia* is in the only fritillary likely to be come across. In May the Wych elms in the area are worth examining for larvæ of *Thecla w-album*. *Nemeobius lucina* was recorded by earlier Yorkshire lepidopterists, but I know of no recent occurrence of the species.

The moths include *Smerinthus ocellatus* and *S. populi* (common), *Chaeorocampa elpena, Dicranura vinula, Notodonta ziczac, N. dromedarius, N. camelina, Lasiocampa quercus, Macrothylacia rubi, Drepana falcataria, Hylophila prasinana, Parasemia plantaginis, Acronycta megacephala, Bryophila perla.* The woods should yield many species of Noctuidæ and Geometridæ.

Several species of dragonflies, including *Aeschna cyanea* and *A. grandis* are to be found, and there is ample scope for anyone interested in the hymenoptera and diptera.

MOLLUSCA.—Mrs. Morehouse writes : The actual grounds and woods of Roche have not been worked properly in the last 20 years. Some of the smaller Helices are to be found, including *V. cellana* Mull. and *V. alliana* Miller. The lakes should yield some aquatic species. A list of 22 species taken on the 1913 meeting is to be found in the report on this meeting in the *Naturalist*, p. 206.

FLOWERING PLANTS.—Mr. J. S. Griffith writes : Roche Abbey is situated in a narrow well-wooded magnesium limestone valley ; the area to be covered by the route includes woodland, meadowland, common and rocky outcrops, so that a varied flora is offered. The area is a sheltered one and the flora more advanced than that of the surrounding country.

The spring flowers should still be in evidence, among which *Helleborus viridis* and *H. foetidus, Lathraea squamaria* and *Daphne laureola* are rather local, but *Viola sylvestris, V. Riviniana, V. hirta, Fragaria vesca, Primula veris, P. vulgaris, Anemone nemorosa, Adosca moschatellina, Lysimachia nemorum* and *Ajuga reptans* are plentiful, while *Narcissus Pseudo-narcissus* is very common but will most likely have finished flowering.

The orchids are represented by *Orchis maculata, O. mascula, O. pyramidalis* and *Listera ovata*, which are found regularly, but *O. morio* and *Ophrys apifera* should be looked for.

King's Wood is the largest woodland in the area and offers *Aquelegia vulgaris, Campanula latifolia, Asperula odorata*, and in places a carpet of *Convallaria majalis* ; in the open sides *Erythræa centaurium* can be seen.

Close to the Abbey are *Parietoria diffusa, Inula Helenium, Symphytum officinale* and two currants, *Ribes alpinum* and *R. grossularia.*

BRYOPHYTA.—Mr. W. Ingham gave a list of species of moses and hepatics for the area in Circular 243, 1913. It included *Tortula pusilla, T. ambigua, Barbula rigidula, Tortula lævipila, Zygodon viridissimus, Ulota intermedia, Preissia quadrata, Lophozia Muelleri, L. excisa, Scapania nemorosa* and *Lejeunea cavifolia.*

LICHENS.—Mr. W. E. L. Wattam writes : On the visit of the Union to Roche Abbey in 1913 I was enabled at the brief time at my disposal to list 18 species, detailed in my report appearing in the *Naturalist* for that year, page 209. It would be interesting to note whether the mining development at Maltby has had any deleterious effect upon the growth of this class of plants since.

Tea will be served at Headquarters at 4-30 p.m., and will be followed by a General Meeting for the election of new members and to receive the reports of the various sections.

The next Meeting will be at Ingleton, Whit week-end, May 31st to June 2nd.

CIRCULAR No. 431

Yorkshire Naturalists' Union.

President:
H. C. VERSEY, D.Sc., F.G.S., The University, Leeds.

Hon. Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds.

Divisional Secretary:
W. G. BRAMLEY, Pallathorpe, York.

The 431st Meeting

WILL BE HELD AT

INGLETON

V.C. 64

WHITSUNTIDE
MAY, 31st to JUNE, 2nd, 1941

TRAVEL FACILITIES.—The L.M.S. Railway has trains from—

Leeds,	8-3 a.m.	Ingleton,	10-41 a.m.
,,	3-44 p.m.	,,	6-8 p.m.
,,	5-45 p.m.	,,	8-18 p.m.

A Bus runs from Skipton to Ingleton at 9-30 a.m., 11-30 a.m. Tues., Sat., Sun., 12-30 (not Sun.), 2-30 p.m., 5-30 p.m. Time taken, 1½ hours.

HEADQUARTERS.—The Wheatsheaf Hotel. Proprietor, J. W. Henderson. Terms, 9/6 per day.

Owing to the influx of evacuees it is very difficult to get beds and rooms ; Those at the hotel are all double beds, and it will be necessary for members to share rooms. Will all who intend to be at the meeting please communicate direct and **at once** to the Secretary, who will try to make arrangements. Those with cars will help by stating this. There is a possibility of getting sleeping accommodation at the Youth Hostel (it is best to be a member of the Association, 2/6 yearly). This would reduce the daily terms to 8/-. Members would need to bring a sheet or sleeping bag.

BOOKS AND MAPS.—The area is included on Sheet 20, Large Sheet Series 1 in. Ordnance Survey. The Geology of Ingleborough is brought out clearly in T. McKenny Hughes' papers in the *Proc. Yorks. Geol. Soc.* 1901 and following, and ' The Geology of the Yorkshire Dales' in the *Proc. Geol, Assoc.* 1933.

The following will be found in *The Naturalist* : W. G. Smith, Ecological Notes, 1906, p. 191 ; Fungi, 1934, p. 255 ; Lichens, 1925, p. 241 ; 1935, p. 235. Conchology—Cash, 1911, p. 325 ; Roebuck, 1906, p. 190.

Routes will be decided by weather conditions, and notice will be left at Headquarters.

Dr. Versey writes : The general geology of the region is well known, but the hard grits and slates of the Ingletonian, the Coniston Limestone,

the Carboniferous Limestone of Ingleborough, and the red beds of the Coal Measures and Permian are all worth re-examination. Special attention might be paid to the relations of the last two formations and to the Craven Fault system north of Ingleton and Thornton.

To botanists interested in ecology, the great variety of rocks in the Ingleton area will give many opportunities for study, and this is enhanced by the range of altitude from 400 ft. O.D. at the foot of the ghylls to 2,400 ft. O.D. on the summit of Whernside. The greatest mass of limestone (the Mountain Limestone) lies between 800 ft. O.D. and 1,400 ft. O.D. Other smaller bands of limestone are found above this in the Yoredale beds, the largest of these being the uppermost, about 2,000 ft. O.D. This is known as the Main limestone of the Yoredales, and it forms the range of cliffs where the most interesting plants are found, the Purple Saxifrage, *S. oppositifolia* ; the Yellow Mountain Saxifrage, *S. aizoides* ; the Twisted podded Whitlow grass, *Draba incana* ; the Spring Sandwort, *Arenaria verna*, and the Roseroot, *Sedum roseum*. Our smallest tree, *Salix herbacea*, is just below on the grit cliff, and here the Filmy Fern, *Hymenophyllum peltatum*, grows, but this is much finer in the ghylls below. Many interesting bryophytes grow on these cliffs on the limestone, *Pseudoleskea catenulata*, *Mnium orthorrhynchum*, *Swartzia montana*, *Bartramia ithyphylla*, *Encalypta rhabdocarpa*, and in odd places *Myurella julacea* ; on the grits we get *Anœctangium compactum*, *Zygodon lapponicus*, *Andreœa alpina*, *Fissidens osmundoides*, *Philonotis capiltaris* and *Anthelia julacea*.

Just above the Main limestone at the North-west corner there is a tumbled mass of millstone grit blocks known as the Arks. Here foxes find their safest home. The rare mountain species of Tipula, *T. serricornis*, occurs with *T. macrocera* and the more plentiful *T. alpium*. The flora is very restricted, the most noticeable being *Lycopodium Selago*, *Rhacomitrium lanuginosum*, *Leptoscyphus* (*Mylia*) *Taylori*, *Empetrum nigrum*, *Vaccinium myrtillus*, *Lastræa dilatata*, and occasionally *Tetraplodon mnioides* and *Cetraria Islandica*. Two other species of *Lycopodium*, *alpinum* and *clavatum*, may be found on the steep covered screes below the Yoredale crags.

Below on the Mountain limestone platform, the Blue moor grass *Sesleria cærulea* is widespread, and where the surface is fissured, as at Southerscales, many interesting plants may be seen—the Globe flower, *Trollius europæus* ; Baneberry, *Actæa spicata* ; Lily of the Valley, *Convallaria majalis* ; Horseshoe Vetch, *Hippocrepis comosa* ; Stone Bramble, *Rubus saxatilis* ; Solomon's Seal, *Polygonatum officinale* ; *Hutchinsia petræa*, *Asplenium viride*, *Lastræa rigida*, *Polypodium calcareum*, and on wet surfaces the Bog Stonecrop, *Sedum villosum* and *Bryum mildeanum*.

The lower end of the ghylls is limestone, thrown down by the northern branch of the Craven fault. Here are found Mealy Primrose, *Primula farinosa* ; the Rock Rose, *Helianthemum Chamæcistus* ; the Carline Thistle, *Carlina vulgaris* ; the Salad Burnet, *Poterium Sanguisorba* ; *Selaginella Selaginoides* and *Blysmus compressus*. In the Thornton ghyll the Dutch Rush, *Equisetum hyemale*, grows, and in the Beezly there is a mass of tufa where the Black Bog Rush, *Schœnus nigricans*, grows with the Grass of Parnassus, *Parnassia palustris*. The association of these two plants provides a habitat for the rare dipteron *Dicranomyia aperta*. Uncommon mosses found here are *Hypnum incurvatum*, *Thuidium delicatulum* and *T. Philiberti*. On the older rocks further upstream are *Archidium alternifolium*, *Andreœa Rothii* and *petrophila*, *Grimmias*, *funalis*, *torquata* and *Hartmani*.

Ornithologists will probably find most interest on Whernside, with its tarns and high moorland area. On the mountains it is often possible to see Raven, Peregrine, Buzzard, and always Curlew, Golden Plover, Redshank, Ring Ousel and Wheatear. The Blackheaded Gulls breed in plenty on the Whernside tarns, and the Dipper is on all the streams.

MEETING.—A tea will be provided at Headquarters on Monday at 5-30 p.m. This will be followed by a General Meeting, when reports on the work done during the week end will be presented, and it is hoped that names will be brought forward for election of new members.

The next Meeting is at Tanfield (V.C. 65) on June 21st.

CIRCULAR No. 432

Yorkshire Naturalists' Union.

President:
H. C. VERSEY, D.Sc., F.G.S., The University, Leeds.

Hon. Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds.

Divisional Secretary:
J. P. UTLEY, B.Sc., Leyburn.

The 432nd Meeting

AT

ABERFORD

On Saturday, JUNE 21st, 1941

This meeting which was to have been held at Tanfield has had to be cancelled owing to the impossibility of getting any catering accommodation there under the present wartime restrictions. As this meeting is the special Entomological Section meeting it has been arranged to hold an alternative excursion to Aberford on this day for the purpose of exploring Hayton Wood and Hazel Wood which lie to the north of Cock Beck and east of the Great North Road.

The Headquarters are the Swan Hotel, Aberford, where members should meet at 1 p.m., Saturday, June 21st. The leader will be Mr. W. Pickles.

Plain Teas can be provided at the Headquarters and in view of the present rationing restrictions will members wishing to avail themselves of this service please endeavour to inform the Secretary of the Entomological Section (Mr. M. D. Barnes) at the earliest possible date.

Travel Facilities—Leeds—Aberford.

City Bus Station 12-10 p.m. Aberford 12-50 p.m.

Leeds—Hook Moor.

City Bus Station 20 mins. past the hour Hook Moor 7 mins. to the hour

Wakefield—Hook Moor[1] take Leeds Bus via Rothwell, 5 mins. past the hour, to Rothwell Tram Terminus, change to Garforth Bus (15 mins. to wait) change Garforth for Hook Moor.

Will members please note that the Union has been invited to hold its Annual Meeting at York on December 6th, 1941. The invitation comes from the York and District Field Naturalists and The Yorkshire Philosophical Society to whom we are very grateful.

[1] Hook Moor lies 1¼ miles south of the meeting place.

YORKSHIRE NATURALISTS' UNION.

For particulars apply to
The Hon. Secretary, Chris. A. Cheetham, Austwick via Lancaster; or to The Hon. Treasurer, S. D. Persy Fisher, Sackville Street, Leeds.

This form, when filled up and signed, should be sent to the Hon. Secretary of the Union, accompanied by the amount of the first year's subscription.

The Subscription of 15/- entitles the members to receive the Union's monthly magazine, "The Naturalist," as well as the "Transactions."

Persons related to and resident in the family of a member are admitted as 5/- members, to enable them to attend excursions, but not to receive the publications.

Qualification for Life Membership:—A Donation of 11 Guineas.

Yorkshire Naturalists' Union.

.....19.....

.....[*Signature and Titles.*]

.....

.....[*Address.*]

wishes to become a member of the Yorkshire Naturalists' Union, and will subscribe FIFTEEN SHILLINGS (15/-) per annum until the end of the year in which written resignation is given.

.....
.....
.....
.....
[*Signature of Proposer and Seconder.*]

Elected.....19 at.....

.....*Chairman's Signature.*

CIRCULAR No. 433

Yorkshire Naturalists' Union.

President:
H. C. VERSEY, D.Sc., F.G.S., The University, Leeds.

Hon. Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds.

Divisional Secretary:
C. W. MASON, Hull.

The 433rd Meeting

WILL BE HELD AT

CAWOOD

On Saturday, JULY 12th, 1941

Difficulties of catering have resulted in the cancelling of the Selby-Hemingbrough Meeting, and the Divisional Secretary for V.C. 64, Mr. W. G. Bramley, Pallathorpe, York, has kindly arranged for headquarters at Cawood at Moore's Cafe, Sherburn Street, where a plain tea at around 1/6 per head may be obtained.

An hourly service of buses run from Selby (B. & S. every even hour and Burnley's Majestic every odd hour). The return bus leaves about 25 minutes to the hour. There is also an hourly bus service between York and Cawood, leaving York at 10 a.m.

Members will meet on Cawood bridge at 11 a.m., cross the river, and proceed up stream on the river bank by Kelfield Ings to

Wharfemouth, then by the road and track *via* Mount Pleasant to Kelfield, returning to Cawood by the Marshes and river bank ; this ground is in V.C. 61.

Tea will be taken at 5-30 p.m., to be followed by a meeting for the election of new members and for presentation of reports by the various sections on the day's excursion. We shall be glad to have names of persons desiring to be elected at this meeting.

After the meeting some members may like to proceed down river on the Cawood side to Cawood Ings and Marshes ; if so, members should note that this lies in V.C. 64.

The district has not been visited previously by the Union and very few records are available, it is therefore very desirable that full lists are made by members of each section for incorporation in the report on the meeting in our journal. Members are asked to forward lists as soon as possible to the General Secretary for this purpose.

YORKSHIRE NATURALISTS' UNION.

For particulars apply to

The Hon. Secretary, Austwick, via Lancaster; or to the Hon. Treasurer, S. D. Persy Fisher, Sackville Street, Leeds.

.....19.....

.....[*Signature and Titles.*]

.....

.....[*Address.*]

wishes to become a member of the Yorkshire Naturalists' Union, and will subscribe FIFTEEN SHILLINGS (15/-) *per annum until the end of the year in which written resignation is given.*

Members are entitled to receive 'The Naturalist' and all other current publication of the Union, free.

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.....
[*Signature of Proposer and Seconder.*]

CIRCULAR No. 434

Yorkshire Naturalists' Union.

President:
H. C. VERSEY, D.Sc., F.G.S., The University, Leeds.

Hon. Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds.

Divisional Secretary:
Miss C. M. ROB, Catton Hall, Thirsk.

The 434th Meeting

WILL BE HELD AT

PICKERING

On Saturday, AUGUST 2nd, 1941

Members will meet at Pickering Station at 10 a.m. They will walk up Newton Dale to Farworth, and then cross over to Dalby Dale, passing the Fox and Rabbit Hotel at about 1 p.m. They will then visit Dalby Marsh and return over Pexton Common to Pickering for tea at the White Swan Hotel at 5-30 p.m.

Mr. E. G. Highfield, of Crabtree, Beacon Park, Pickering, has kindly made all the arrangements, and he will be greatly helped if members will notify him of their intention to be present at the tea table and so enable him to complete the arrangements. Should any be arriving later than 10 a.m. they should inform Mr. Highfield and he will suggest the way to join up with the main body of members.

Buses arrive at Pickering from Scarborough and Helmsley at 9-30 a.m. and return at 8 p.m.

BOTANY.—In Newton Dale there is a piece of old wall which is very prolific in ferns, including *Cystopteris fragilis*, *Polystichum angulare*, and *Polypodium calcareum* ; also Adder's tongue and Moonwort near Farworth.

Epipactus latifolia has been found in the woods.

In Dalby Marsh, *Epipactis palustris*, Grass of Parnassus, Plumed Thistle, *Drosera* (both long and round leaf), *Pinguicula* and *Orchis prætermissa* with the Fragrant Orchid.

A Meeting to elect members and to hear reports from the various Sections on the day's excursion will follow the tea at approximately 6-30 p.m. We shall be glad to have names of persons desiring to become members.

YORKSHIRE NATURALISTS' UNION.

For particulars apply to

The Hon. Secretary, Austwick, via Lancaster; or to the Hon. Treasurer, S. D. Persy Fisher, Sackville Street, Leeds.

.....19.....

.....[*Signature and Titles.*]

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.....[*Address.*]

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Members are entitled to receive 'The Naturalist' and all other current publication of the Union, free.

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[*Signature of Proposer and Seconder.*]

CIRCULAR No. 435

Yorkshire Naturalists' Union.

President:
H. C. VERSEY, D.Sc., F.G.S., The University, Leeds.

Hon. Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds.

The 435th Meeting

WILL BE THE

FUNGUS FORAY

AT

CAWTHORNE

for Cannon Hall Woods and Bretton Park

From Friday, September 26th to Wednesday, October 1st, 1941

MYCOLOGICAL COMMITTEE:

Chairman: J. W. H. JOHNSON, M.S., F.I.C., Wakefield.
Convener: Miss J. GRAINGER, Meltham.
Recorders: Dr. J. GRAINGER, Huddersfield; W. G. BRAMLEY, Bolton Percy.
Rep. on Executive: R. FOWLER JONES, Ilkey.

HEADQUARTERS.—Cinderhills Farm, Cawthorne, near Barnsley. Accommodation is limited and members must be prepared to share rooms. Terms: 7/- per day, but members must bring their own sugar, butter and bacon. Application for rooms should be made to the Convener, Miss J. Grainger, Wilshaw Road, Meltham. If desired the Convener will endeavour to get rooms at a Barnsley Hotel (4 miles away). Day visitors bring own eatables.

BOOKS AND MAPS.—Members are asked to bring reference books and maps, Ordnance Survey 1″, large sheet series 37.

PERMISSION to visit their estates has been given by H. Spencer Stanhope, Esq., for the park and woods of Cannon Hall, and Lord Allendale, for Bretton Park and woodlands.

ANNUAL MEETING.—This meeting will be held at 8 p.m., Saturday, September 27th, unless the number of day visitors renders an earlier hour desirable.

Workroom at Cinderhills Farm, microscopes and books should be brought.

TRAVEL FACILITIES.—The Convener will forward bus times when accommodation is arranged.

The Saturday route will be in Cannon Hall Park, main entrance at 10 a.m.

The Next Meeting will be the Annual Meeting at York on December 6th, 1941.

YORKSHIRE NATURALISTS' UNION.

For particulars apply to

The Hon. Secretary, Austwick, via Lancaster; or to the Hon. Treasurer, S. D. Persy Fisher, Sackville Street, Leeds.

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Members are entitled to receive 'The Naturalist' and all other current publication of the Union, free.

.....
.....
} [*Signature of Proposer and Seconder.*]

CIRCULAR No. 436

Yorkshire Naturalists' Union.

President:

H. C. VERSEY, D.Sc., F.G.S., The University, Leeds.

Hon. Secretary:

CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer:

S. D. PERSY FISHER, Sackville Street, Leeds.

Vice-Presidents:

PROF. SIR A. C. SEWARD, M.A., F.R.S., Cambridge.
THOMAS SHEPPARD, M.Sc., F.G.S., F.S.A.Scot., A.L.S., Hull.
PROF. W. GARSTANG, M.A., D.Sc., F.Z.S., Oxford.
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PROF. J. H. PRIESTLEY, D.S.O., B.Sc., F.L.S., Leeds.
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J. MEIKLE BROWN, B.Sc., F.R.E.S., Robin Hood's Bay.
W. S. BISAT, M.Sc., F.G.S., North Ferriby, East Yorks.
E. G. BAYFORD, F.R.E.S., Barnsley.
Prof. W. H. PEARSALL, D.Sc., F.L.S., Sheffield.
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RALPH CHISLETT, F.R.P.S., M.B.O.U., Rotherham.
W. WATSON, D.Sc. (Lond.), A.L.S., Taunton.

The 436th Meeting

and 80th Annual Meeting

WILL BE HELD AT THE

YORKSHIRE MUSEUM

YORK

On Saturday, 6th December, 1941

The Yorkshire Philosophical Society and the York and District Field Naturalists have kindly invited the Union to hold the Annual Meeting in York this year. We are very grateful to them for making the following arrangements for us.

The meetings will be held at the Yorkshire Museum in the Tempest Anderson Hall. The Museum will be open for a general visit, and the Keeper, Mr. R. Wagstaffe, has arranged that the following collections will be ready for inspection and that members of the York societies will be present to answer enquiries.

(*a*) The H. J. Wilkinson Herbariums.

(*b*) The Sowden Collection of Shells.

(*c*) The Oxley Grabham Collection of Mammal Skins.

(*d*) The Backhouse Collection of Bird Skins.

(*e*) The St. Quintin Collection of Lepidoptera.

PROGRAMME

11-0 a.m. **Sectional and Committee Meetings.** Notices indicating the room for the various meetings will be displayed at the entrance to the Hall.

11-30 a.m. **Executive Meeting.**

12 noon. **The General Committee Meeting.**

1-0 p.m. **Lunch** will be provided at Terry's Restaurant or Betty's in St. Helen's Square, where tables will be reserved for members who notify Mr. A. Wentworth Ping, St. Olave's, Clifton, York, of their intention to be present. Members are earnestly asked **to do this at once and not defer it and then forget** as they do so often.

2-0 p.m. **The Annual Meeting and the Presidential Address.**

The President of the York Naturalists, Mr. Stanley Allen, will welcome the Union on their visit.

Will members of the **Executive** and of the **General Committee** take note of the above times as no further notice of these meetings will be sent.

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